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Requester's Full Name: S. Reddy Pannala Examiner #: 79052 Date: 1/29/03
 Art Unit: 2177 Phone Number 30 5-3390 Serial Number: CA/512949
 Mail Box and Bldg/Room Location: CPK2, 4C33 Results Format Preferred (circle): PAPER DISK E-MAIL

If more than one search is submitted, please prioritize searches in order of need.

Please provide a detailed statement of the search topic, and describe as specifically as possible the subject matter to be searched. Include the elected species or structures, keywords, synonyms, acronyms, and registry numbers, and combine with the concept or utility of the invention. Define any terms that may have a special meaning. Give examples or relevant citations, authors, etc, if known. Please attach a copy of the cover sheet, pertinent claims, and abstract.

Title of Invention: Indexing system and method for nearest neighbor search in high dimensional data spaces
 Inventors (please provide full names): Guang-Ho Cha, Chin-Wan Chung, Dragutin Petkovic and Xiaoming Zhu

Earliest Priority Filing Date: 02/25/2000

For Sequence Searches Only Please include all pertinent information (parent, child, divisional, or issued patent numbers) along with the appropriate serial number.

Reason for
or
Advantages of
or
Benefits of

conversion of polar coordinates to cartesian coordinates.

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	Type of Search	Vendors and cost where applicable
Searcher: <u>Anne Herlihy</u>	NA Sequence (#) _____	STN _____
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Date Completed: <u>1/30/03</u>	Litigation _____	Lexis/Nexis <u>X</u>
Searcher Prep & Review Time: <u>30</u>	Fulltext <u>X</u>	Sequence Systems _____
Clerical Prep Time: _____	Patent Family _____	WWW/Internet <u>X</u>
Online Time: <u>120</u>	Other _____	Other (specify) _____

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S1	59474	(NEAR OR NEAREST)()NEIGHBOR? OR KNN OR (BILINEAR OR BI()LI-NEAR)()INTERPOLATION OR SINGLE()LINKAGE? ? OR (BEST()MATCH???) (3N)(SEARCH??? OR QUER????) OR SIMILARITY()JOIN OR POST()OFF-ICE OR CLOSEST()POINT
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S5	707987	QUERY??? OR QUERIES OR SEARCH???
S6	612182	VECTOR? ?
S7	37	S1 AND S2
S8	37	S7 OR (S7 AND S3:S6)
S9	25	RD (unique items)
S10	59	S1 AND S4
S11	32	RD (unique items)
S12	30	S11 NOT S9
S13	30	S12 OR (S12 AND (S3 OR S5:S6))

9/5/1 (Item 1 from file: 108)
DIALOG(R)File 108:AEROSPACE DATABASE
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01950507 A91-52120

False alarm effects on estimation in multitarget trackers

BERMAN, ARIE; HAMMER, AMNON (Rafael Armament Development Authority, Haifa, Israel)

IEEE Transactions on Aerospace and Electronic Systems (ISSN 0018-9251), vol. 27, July 1991, p. 675-682.

Jul. 1991 11 REFS.

LANGUAGE: English

COUNTRY OF ORIGIN: Israel COUNTRY OF PUBLICATION: United States

DOCUMENT TYPE: JOURNAL ARTICLE

DOCUMENTS AVAILABLE FROM AIAA Technical Library

JOURNAL ANNOUNCEMENT: IAA9122

An analysis of false alarm effects on tracking filter performance in multitarget track-while-scan radars, using variable correlation gates, is presented. The false alarms considered originate from noise, clutter, and crossing targets. The dimensions of the correlation gates are determined by filter prediction and measurement error variances. Track association is implanted either by means of a distance weighted average of the observations or by the **nearest neighbor** rule. State estimation is performed by means of a second-order discrete Kalman filter, taking into consideration random target maneuvers. Measurements are made in **polar coordinates**, while target dynamics are estimated in Cartesian coordinates, resulting in coupled linear filter equations. The effect of false alarms on the observation noise covariance matrix, and hence on state estimation errors, is analyzed. A computer simulation example, implementing radar target tracking with a variable correlation gate in the presence of false alarms, is discussed (I.E.)

SOURCE OF ABSTRACT/SUBFILE: AIAA

DESCRIPTORS: *COMPUTERIZED SIMULATION; *FALSE ALARMS; *KALMAN FILTERS; *MULTIPLE TARGET TRACKING; *RADAR TRACKING; *STATE ESTIMATION; CARTESIAN COORDINATES; CLUTTER; LINEAR FILTERS

SUBJECT CLASSIFICATION: 8732 Communications & Radar (1987-)

9/5/2 (Item 2 from file: 108)
DIALOG(R)File 108:AEROSPACE DATABASE
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01599380 A86-22928

Some problems related to cartesian space analysis of digital radar data

PUHAKKA, T.; RUOSTEENOJA, K. (Helsinki, University, Finland)

IN: Conference on Radar Meteorology, 22nd, Zurich, Switzerland, September 10-13, 1984, Preprints (A86-22901 09-47). Boston, MA, American Meteorological Society, 1984, p. 166-171. Research supported by the Academy of Finland.

1984

LANGUAGE: English

COUNTRY OF ORIGIN: Finland COUNTRY OF PUBLICATION: United States

DOCUMENT TYPE: CONFERENCE PAPER

DOCUMENTS AVAILABLE FROM AIAA Technical Library

JOURNAL ANNOUNCEMENT: IAA8609

The problems of poor original resolution and interpolation in processing digital radar data are discussed. Emphasis is given to artifacts caused by interpolating coarse data into a cartesian coordinate system by means of 8-point **bilinear interpolation**. Some techniques for eliminating or reducing artifacts are described, including filtering, and enhancement of the original resolution. In addition to filtering and resolution enhancement methods, improvements can also be obtained by averaging radar scans for several quasi-stationary weather patterns before final filtering.

Corrected CAPPI images of radar reflectivity for Sept. 17, 1978 are presented in order to illustrate the processing techniques (I.H.)

SOURCE OF ABSTRACT/SUBFILE: AIAA

DESCRIPTORS: *CARTESIAN COORDINATES; *DIGITAL DATA; *METEOROLOGICAL RADAR ; *RADAR DATA; *RADAR SCANNING; **POLAR COORDINATES** ; REFLECTANCE

9/5/3 (Item 1 from file: 8)

DIALOG(R)File 8: Ei Compendex(R)

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06022011 E.I. No: EIP02126890890

Title: New method in ISAR image reconstruction

Author: Sasaki, Koichi; Shimizu, Masaru; Watanabe, Yasuo; Pottier, Eric
Corporate Source: Dept. of Elec. and Electronics Eng. Nippon Institute of
Technology, Miyashiromachi, Saitama-ken 345-8501, Japan

Conference Title: 2001 CIE International Conference on Radar Proceedings

Conference Location: Beijing, China Conference Date: 20011015-20011018

Sponsor: Chinese Institute of Electronics (CIE)

E.I. Conference No.: 59053

Source: CIE International Conference of Radar Proceedings 2001. p 662-664
(IEEE cat n 01TH8559)

Publication Year: 2001

Language: English

Document Type: CA; (Conference Article) Treatment: T; (Theoretical); X;
(Experimental)

Journal Announcement: 0203W4

Abstract: In this paper, three methods of ISAR image reconstruction are presented. The first is the line-of-sight image reconstruction based on the narrow angle approximation. The second is the fixed scene image reconstruction via proposed **polar** -to-rectangular **coordinate** transformation which is based on the **nearest neighbor** interpolation utilizing the Delaunay triangulation. The third method is to obtain images directly from the polar format data without the coordinate transformation.
4 Refs.

Descriptors: *Inverse synthetic aperture radar; Image reconstruction; Radar imaging; Image retrieval; Approximation theory; Fourier transforms; Algorithms; Interpolation; Error analysis; Computer simulation; Diffraction

Identifiers: Line of sight image reconstruction; Narrow angle approximation; Fixed scene image reconstruction; **Polar** to rectangular **coordinate** transformation; Delaunay triangulation; **Polar** format; **Coordinate** transform algorithm

Classification Codes:

716.2 (Radar Systems & Equipment); 723.2 (Data Processing); 921.6 (Numerical Methods); 921.3 (Mathematical Transformations); 723.5 (Computer Applications)

716 (Electronic Equipment, Radar, Radio & Television); 723 (Computer Software, Data Handling & Applications); 921 (Applied Mathematics)

71 (ELECTRONICS & COMMUNICATION ENGINEERING); 72 (COMPUTERS & DATA PROCESSING); 92 (ENGINEERING MATHEMATICS)

9/5/4 (Item 2 from file: 8)

DIALOG(R)File 8: Ei Compendex(R)

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05960302 E.I. No: EIP01526773089

Title: Image identification using the segmented Fourier transform and competitive training in the HAVNET neural network

Author: Sujan, V.A.; Mulqueen, M.P.

Corporate Source: Dept. of Mechanical Engineering Massachusetts Inst. of Technology, Cambridge, MA 02139, United States

Conference Title: IEEE International Conference on Image Processing (ICIP) 2001

Conference Location: Thessaloniki, Greece Conference Date: 20011007-20011010

Sponsor: IEEE

E.I. Conference No.: 58800

Source: IEEE International Conference on Image Processing v 1 2001. p 489-492 (IEEE cat n 01CH37205)

Publication Year: 2001

CODEN: 85QTAW

Language: English
Document Type: CA; (Conference Article) Treatment: T; (Theoretical); X;
(Experimental)

Journal Announcement: 0112W5

Abstract: As optical modelless image identification algorithm is presented. The system uses the Hausdorff-Voronoi Network (HAVNET), as artificial neural network designed for two-dimensional binary pattern recognition. A detailed review of the architecture, the learning equations, and the recognition equations for the HAVNET network are presented. Competitive learning has been implemented in training the network using a **nearest - neighbor** technique. The image identification system presented in this paper is applied to two tasks: the optical recognition of a set of American sign language signals and identification of grayscale fingerprints. Image preprocessing includes edge enhancement by histogram equalization, application of a Laplacian filter and thresholding. A segmented Hankel and Fourier transformation in **polar coordinates** is applied to the binary image giving a rotationally and translationally invariant image structure. This preprocessed image employs the HAVNET neural network for successful image identification. 12 Refs.

Descriptors: *Image analysis; Image segmentation; Fourier transforms; Neural networks; Imaging systems; Optical systems; Object recognition; Edge detection; Image enhancement; Adaptive filtering

Identifiers: Image identification; Segmented Fourier transform; Hausdorff-Voronoi network; Two dimensional binary pattern recognition; Optical recognition

Classification Codes:

723.2 (Data Processing); 921.3 (Mathematical Transformations); 741.1 (Light & Optics)

723 (Computer Software, Data Handling & Applications); 921 (Applied Mathematics); 741 (Light, Optics & Optical Devices)

72 (COMPUTERS & DATA PROCESSING); 92 (ENGINEERING MATHEMATICS); 74 (LIGHT & OPTICAL TECHNOLOGY)

9/5/5 (Item 3 from file: 8)

DIALOG(R) File 8: Ei Compendex(R)

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05727030 E.I. No: EIP00125435469

Title: Visual recognition of complex medical lesions using 2-D shape

Author: Chodorowski, Artur; Gustavsson, Tomas; Mattsson, Ulf

Corporate Source: Chalmers Univ of Technology, Goteborg, Sweden

Source: Doktorsavhandlingar vid Chalmers Tekniska Hogskola n 1646 2000. p 1-10

Publication Year: 2000

CODEN: DCTHAT ISSN: 0346-718X

Language: English

Document Type: JA; (Journal Article) Treatment: T; (Theoretical)

Journal Announcement: 0101W4

Abstract: Different shape representation and classification methods for complex medical lesions were compared using oral lesions as a case study. The problem studied was the discrimination between potentially cancerous lesions, called leukoplakia, and other usually harmless lesions, called lichenoid reactions, which can appear in human oral cavities. The classification problem is difficult because these lesions vary in shape within classes and there are no easily recognizable characteristics. The representations evaluated were the centroidal profile function, the curvature function, and **polar** and complex **coordinate** functions. From these representations, translation, scale and rotation independent features were derived using Fourier transformations, auto-regressive modeling, and Zernike moments. A nonparametric **kNN** classifier with the leave-one-out cross-validation method was used as a classifier. An overall classification accuracy of about 84% was achieved using only the shape properties of the lesions, compared with a human visual classification rate of 65%. The best results were obtained using complex representation and Fourier/Zernike methods. In clinical practice, the preliminary diagnosis is based mainly on the visual inspection of the oral cavity, using both color, shape and texture as differentiating parameters. This study showed that machine

analysis of shape could also play an important part in diagnosis and decisions regarding future treatment. (Author abstract) 22 Refs.

Descriptors: *Pattern recognition; Medical imaging; Fourier transforms; Image analysis; Computer aided diagnosis; Mathematical models; Regression analysis

Identifiers: Zernike moments; Fourier descriptors

Classification Codes:

723.5 (Computer Applications); 741.1 (Light/Optics); 461.1 (Biomedical Engineering); 921.3 (Mathematical Transformations); 922.2 (Mathematical Statistics)

723 (Computer Software); 741 (Optics & Optical Devices); 461 (Biotechnology); 921 (Applied Mathematics); 922 (Statistical Methods)

72 (COMPUTERS & DATA PROCESSING); 74 (OPTICAL TECHNOLOGY); 46 (BIOENGINEERING); 92 (ENGINEERING MATHEMATICS)

9/5/6 (Item 4 from file: 8)

DIALOG(R)File 8:Ei Compendex(R)

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04602463 E.I. No: EIP97013497279

Title: Bilinear interpolation from polar to rectangular point raster for inverse problem solving

Author: Dragan, I.; Iavors'kyi, B.; Chorna, L.

Corporate Source: Ivan Pul'uj Ternopil Instrument Making Inst, Ternopil, Ukraine

Conference Title: Proceedings of the 1996 6th International Conference on Mathematical Methods in Electromagnetic Theory, MMET'96

Conference Location: Lviv, Ukraine Conference Date: 19960910-19960913

Sponsor: IEEE; URSI

E.I. Conference No.: 45862

Source: Mathematical Methods in Electromagnetic Theory, MMET, Conference Proceedings 1996. IEEE, Piscataway, NJ, USA, 96TH8183. p 429-431

Publication Year: 1996

CODEN: 002506

Language: English

Document Type: CA; (Conference Article) Treatment: A; (Applications); T; (Theoretical)

Journal Announcement: 9703W2

Abstract: The direct Fourier method (DFM) offers the most promising tomographic image reconstruction. The DFM includes the three main procedures: the one-dimensional transform projection for different angles, the interpolation from polar to rectangular point raster and the two-dimensional inverse fast Fourier transform. The interpolation algorithm is not a trivial task due to time resource. This algorithm is divided into two stages. At the first stage, the rectangular raster points involved into the given sector are **searched**. At the second stage, some coefficients, being the distance measured between rectangular and polar raster points, are computed on the basis of **polar coordinates** of rectangular eigenlines. 4 Refs.

Descriptors: *Computerized tomography; Inverse problems; Interpolation; Fast Fourier transforms; Geometry; Algorithms

Identifiers: Polar point raster; Rectangular point raster

Classification Codes:

723.5 (Computer Applications); 921.2 (Calculus); 921.6 (Numerical Methods); 921.3 (Mathematical Transformations)

723 (Computer Software); 921 (Applied Mathematics)

72 (COMPUTERS & DATA PROCESSING); 92 (ENGINEERING MATHEMATICS)

9/5/7 (Item 1 from file: 35)

DIALOG(R)File 35:Dissertation Abs Online

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01423598 ORDER NO: AADAA-I9521810

REPRESENTATIONS AND AVERAGED EQUATIONS FOR SYSTEMS OF WEAKLY COUPLED LIMIT CYCLE OSCILLATORS (NEAREST NEIGHBOR COUPLING)

Author: SORENSEN, JODY M.

Degree: PH.D.
Year: 1994
Corporate Source/Institution: NORTHWESTERN UNIVERSITY (0163)
Source: VOLUME 56/03-B OF DISSERTATION ABSTRACTS INTERNATIONAL.
PAGE 1470. 47 PAGES
Descriptors: MATHEMATICS
Descriptor Codes: 0405

In this dissertation we work with differential equations which represent systems of two-dimensional limit cycle oscillators with weak (order ϵ) **nearest neighbor** coupling. We give an explicit formula for changing a system from its given form in rectangular coordinates into a type of **polar coordinates**, where $\theta_{\text{sb}\{k\}}$ measures the distance along the k th limit cycle and $r_{\text{sb}\{k\}}$ measures the distance away from this limit cycle. This formula gives us the differential equations in **polar coordinates** for the terms up to order ϵ .

Once we have the differential equations in **polar coordinates**, our goal is to understand the behavior of the flow on the invariant manifold. When $\epsilon = 0$ the system has an attracting invariant manifold given by the product of the limit cycles for each oscillator. Standard perturbation theory tells us that this invariant manifold persists and is ϵ near the unperturbed manifold for small enough values of ϵ . To understand the flow on this perturbed invariant manifold, we carry out another change of coordinates in order to eliminate the linear dependence on $r_{\text{sb}\{k\}}$ in $\dot{\theta}_{\text{sb}\{k\}}$ when $\epsilon = 0$. We first do such a coordinate change on a single limit cycle oscillator using two different methods. We then show that the averaged equations of the resulting differential equations are equal up to order ϵ . Next we use one of the two methods to eliminate the linear $r_{\text{sb}\{k\}}$ dependence for a system of weakly coupled oscillators. This gives us a formula for the flow on the invariant manifold up to order ϵ .

Finally, we perform all of the above coordinate changes on a specific example. We start with a system with circular limit cycles and linear coupling. We first change this system into our **polar-like coordinates**, and we then eliminate the linear dependence on $r_{\text{sb}\{k\}}$ in $\dot{\theta}_{\text{sb}\{k\}}$, which gives us the flow on the perturbed invariant manifold up to order ϵ . The systematic methods we have developed in this paper yield the same results as ad hoc methods used in other papers, and apply to a wider range of examples.

9/5/8 (Item 2 from file: 35)
DIALOG(R)File 35:Dissertation Abs Online
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899688 ORDER NO: AAD85-25812
CLASSICAL KINK DYNAMICS AND QUANTUM THERMODYNAMICS IN EASY-PLANE MAGNETIC CHAINS WITH AN APPLIED MAGNETIC FIELD (SINE-GORDON, SOLITONS, FERROMAGNETS)

Author: WYSIN, GARY MATTHEW
Degree: PH.D.
Year: 1985
Corporate Source/Institution: CORNELL UNIVERSITY (0058)
Source: VOLUME 46/09-B OF DISSERTATION ABSTRACTS INTERNATIONAL.
PAGE 3112. 313 PAGES
Descriptors: PHYSICS, SOLID STATE
Descriptor Codes: 0611

The classical dynamics of soliton-like kink excitations in one-dimensional (1-D) easy-plane ferromagnets (EPFs) and antiferromagnets (EPAs) with an applied magnetic field in the easy plane is studied. For EPFs, (e.g. CsNiF_3), numerical simulation has demonstrated an unusual energy vs. velocity dispersion, in contrast to the frequently assumed sine-Gordon (sG) theory. In addition to perturbed sG kinks, there are also stable kinks with negative effective mass. For fields greater than a critical field, only negative effective mass kinks exist. Simulation of kink-antikink ($K'K$) collisions has shown a variety of outgoing states, as a function of the field and incoming $K'K$ velocity. Generally, as a function of increasing field, the outgoing states are sG-like transmission,

oscillatory bound states and reflection of the pair. Finally, transitions to chaos in the EPF with damping are demonstrated for specific applied AC plus DC fields.

For EPAs, (e.g. TMMC) improvements are made over previous work for the yz (out-of-plane) kinks by using spherical **coordinates** where the **polar** axis is parallel to the applied field (x-axis). Using these coordinates, linear stability analysis shows that there is a velocity-dependent critical field necessary for yz kink stability. The geometric similarity of yz and xz (in-plane) kinks has motivated a general kink Ansatz that includes the two as specific limits, and shows they can be considered as belonging to one continuously connected energy dispersion curve. The Ansatz and yz stability results are verified by a numerical simulation which also shows that xy kinks are stable both below and above the field $b(c)$ at which static xy and yz kinks have equal energy. The xy kinks have a negative effective mass at fields greater than $b(c)$, similar to the EPF kinks.

A quantum Monte Carlo method is used to obtain the thermodynamics of quantum EPF chains. For spin-1/2, vertex weights for the equivalent 2-D lattice are calculated analytically for 8 and 16 vertex models, and computations are applied to $(C(,6)H(,11)NH(,3))CuBr(,3)$. The spin-1/2 effective Hamiltonian for the 2-D lattice is shown to consist of different **nearest neighbor** exchange in the two directions, plus a next **nearest neighbor** diagonal exchange and a 4-spin coupling. For spin-1, vertex weights are calculated analytically for 29 and 41 vertex models, and computations are applied to $CsNiF(,3)$. Comparison is made with experiment and sG soliton theory.

9/5/9 (Item 1 from file: 2)

DIALOG(R)File 2:INSPEC

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7218627 INSPEC Abstract Number: B2002-04-6320-051

Title: Coordinate transformation by nearest neighbor interpolation for ISAR fixed scene imaging

Author(s): Sasaki, K.; Shimizu, M.; Watanabe, Y.

Author Affiliation: Dept. of Electr. & Electron. Eng., Nippon Inst. of Technol., Saitama, Japan

Journal: IEICE Transactions on Electronics vol.E84-C, no.12 p. 1905-9

Publisher: Inst. Electron. Inf. & Commun. Eng,

Publication Date: Dec. 2001 Country of Publication: Japan

CODEN: IELEEEJ ISSN: 0916-8524

SICI: 0916-8524(200112)E84C:12L:1905:CTNN;1-P

Material Identity Number: P712-2002-001

Language: English Document Type: Journal Paper (JP)

Treatment: Practical (P); Theoretical (T)

Abstract: The reflection signal in inverse synthetic aperture radar is measured in the **polar coordinates** defined by the object rotation angle and frequency. The reconstruction of fixed scene images requires the **coordinate** transformation of the **polar** format data into the rectangular spatial frequency domain, which is then processed by the inverse Fourier transform. In this paper, a fast and flexible method of coordinate transformation based on the **nearest neighbor** interpolation utilizing the Delauney triangulation is first presented. Then, the induced errors in the transformed rectangular spatial frequency data and the resultant fixed scene images are investigated by simulation under the uniform plane wave transmit-receive mode over the swept frequency 120-160 GHz, and the results, which demonstrate the validity of the current coordinate transformation, are presented. (13 Refs)

Subfile: B

Descriptors: error analysis; Fourier transforms; image reconstruction; interpolation; mesh generation; radar computing; radar imaging; synthetic aperture radar

Identifiers: coordinate transformation; **nearest neighbor** interpolation; ISAR fixed scene imaging; reflection signal; inverse synthetic aperture radar; **polar coordinate**; object rotation angle;

object rotation frequency; fixed scene image reconstruction; polar format data; rectangular spatial frequency domain; inverse Fourier transform; Delauney triangulation; transformed rectangular spatial frequency data errors; fixed scene image errors; uniform plane wave transmit-receive mode; swept frequency; 120 to 160 GHz

Class Codes: B6320 (Radar equipment, systems and applications); B6310 (Radar theory); B6135 (Optical, image and video signal processing); B0290B (Error analysis in numerical methods); B0290X (Integral transforms in numerical analysis); B0290F (Interpolation and function approximation (numerical analysis))

Numerical Indexing: frequency 1.2E+11 to 1.6E+11 Hz

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9/5/10 (Item 2 from file: 2)

DIALOG(R)File 2:INSPEC

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7192797 INSPEC Abstract Number: C2002-04-6160S-002

Title: An efficient indexing method for nearest neighbor searches in high-dimensional image databases

Author(s): Guang-Ho Cha; Xiaoming Zhu; Petkovic, P.; Chung, C.W.

Author Affiliation: Dept. of Multimedia Inf., Tongmyong Univ. of Inf. Technol., Pusan, South Korea

Journal: IEEE Transactions on Multimedia vol.4, no.1 p.76-87

Publisher: IEEE,

Publication Date: March 2002 Country of Publication: USA

CODEN: ITMUF8 ISSN: 1520-9210

SICI: 1520-9210(200203)4:1L.76:EIMN;1-Y

Material Identity Number: H274-2002-001

U.S. Copyright Clearance Center Code: 1520-9210/02/\$17.00

Document Number: S1520-9210(02)01399-8

Language: English Document Type: Journal Paper (JP)

Treatment: Theoretical (T)

Abstract: **Nearest neighbor** (NN) **search** is emerging as an important **search** paradigm in a variety of applications in which objects are represented as **vectors** of d numeric features. However, despite decades of efforts, except for the filtering approach such as the VA-file, the current solutions to find exact kNNs are far from satisfactory for large d. The filtering approach represents **vectors** as compact approximations and by first scanning these smaller approximations, only a small fraction of the real **vectors** are visited. In this paper, we introduce the **local polar coordinate** file (LPC-file) using the filtering approach for **nearest - neighbor searches** in high-dimensional image databases. The basic idea is to **partition** the **vector space** into rectangular **cells** and then to approximate **vectors** by **polar coordinates** on the partitioned **local cells**. The LPC information significantly enhances the discriminatory power of the approximation. To demonstrate the effectiveness of the LPC-file, we conducted extensive experiments and compared the performance with the VA-file and the sequential scan by using synthetic and real data sets. The experimental results demonstrate that the LPC-file outperforms both of the VA-file and the sequential scan in total elapsed time and in the number of disk accesses and that the LPC-file is robust in both "good" distributions (such as random) and "bad" distributions (such as skewed and clustered). (32 Refs)

Subfile: C

Descriptors: database indexing; database theory; **search** problems; visual databases

Identifiers: **nearest neighbor searches** ; image databases; indexing; filtering; **local polar coordinate**

Class Codes: C6160S (Spatial and pictorial databases); C5260B (Computer vision and image processing techniques); C4250 (Database theory)

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9/5/11 (Item 3 from file: 2)

DIALOG(R)File 2:INSPEC

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7146233 INSPEC Abstract Number: B2002-02-6310-039

Title: Inverse synthetic aperture imaging by nearest neighbor interpolation

Author(s): Shimizu, M.; Sasaki, K.; Matsubara, H.; Watanabe, Y.

Author Affiliation: Graduate Sch. of Eng., Nippon Inst. of Technol., Saitama, Japan

Conference Title: Proceedings of the 2000 International Symposium on Antennas and Propagation (ISAP2000) Part vol.4 p.1669-72 vol.4

Publisher: IEICE of Japan, Tokyo, Japan

Publication Date: 2000 Country of Publication: Japan 4 vol.(vii+vi+viii+v+1704) pp.

ISBN: 4 88552 169 6 Material Identity Number: XX-2001-02280

Conference Title: Proceedings of 2000 International Symposium on Antennas and Propagation ISAP 2000

Conference Date: 21-25 Aug. 2000 Conference Location: Fukuoka, Japan

Language: English Document Type: Conference Paper (PA)

Treatment: Theoretical (T); Experimental (X)

Abstract: A method of interpolating the rectangular data from the **polar coordinate** data of the diffraction pattern utilizing **nearest neighbor** interpolation is introduced, and then the experimental results of inverse synthetic aperture imaging at 120 to 160 GHz, including the reconstruction of the all-round image of the object, are reported. (6 Refs)

Subfile: B

Descriptors: electromagnetic wave diffraction; image reconstruction; interpolation; radar imaging; synthetic aperture radar

Identifiers: inverse synthetic aperture imaging; **nearest neighbor** interpolation; rectangular data; diffraction pattern; image reconstruction; 120 to 160 GHz

Class Codes: B6310 (Radar theory); B6135 (Optical, image and video signal processing); B0290F (Interpolation and function approximation (numerical analysis))

Numerical Indexing: frequency 1.2E+11 to 1.6E+11 Hz

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9/5/12 (Item 4 from file: 2)

DIALOG(R)File 2:INSPEC

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6821379 INSPEC Abstract Number: C2001-03-7330-007

Title: Visual recognition of complex medical lesions using 2D shape

Author(s): Chodorowski, A.; Gustavsson, T.; Mattsson, U.

Author Affiliation: Dept. of Signals & Syst., Chalmers Univ. of Technol., Goteborg, Sweden

Journal: Proceedings of the SPIE - The International Society for Optical Engineering Conference Title: Proc. SPIE - Int. Soc. Opt. Eng. (USA)

vol.3959 p.290-9

Publisher: SPIE-Int. Soc. Opt. Eng,

Publication Date: 2000 Country of Publication: USA

CODEN: PSISDG ISSN: 0277-786X

SICI: 0277-786X(2000)3959L:290:VRCM;1-5

Material Identity Number: C574-2000-160

U.S. Copyright Clearance Center Code: 0277-786X/2000/\$15.00

Conference Title: Human Vision and Electronic Imaging V

Conference Sponsor: IS&T; SPIE

Conference Date: 24-27 Jan. 2000 Conference Location: San Jose, CA, USA

Language: English Document Type: Conference Paper (PA); Journal Paper (JP)

Treatment: Practical (P); Theoretical (T)

Abstract: Different shape representation and classification methods for complex medical lesions were compared using oral lesions as a case study. The problem studied was the discrimination between potentially cancerous lesions, called leukoplakia, and other usually harmless lesions, called lichenoid reactions, which can appear in human oral cavities. The classification problem is difficult because these lesions vary in shape within classes and there are no easily recognizable characteristics. The

representations evaluated were the centroidal profile function, the curvature function, and **polar** and complex **coordinate** functions. From these representations, translation, scale and rotation independent features were derived using Fourier transformations, auto-regressive modeling and Zernike moments. A nonparametric **kNN** classifier with the leave-one-out cross-validation method was used as a classifier. An overall classification accuracy of about 84% was achieved using only the shape properties of the lesions, compared with a human visual classification rate of 65%. The best results were obtained using complex representation and Fourier/Zernike methods. In clinical practice, the preliminary diagnosis is based mainly on the visual inspection of the oral cavity, using both color, shape and texture as differentiating parameters. This study showed that machine analysis of shape could also play an important part in diagnosis and decisions regarding future treatment. (22 Refs)

Subfile: C

Descriptors: cancer; Fourier transforms; image classification; image representation; medical image processing

Identifiers: visual recognition; complex medical lesion recognition; 2D shape; two dimensional shape; shape representation; shape classification; oral lesions; cancer; leukoplakia; lichenoid reactions; centroidal profile function; curvature function; **polar coordinate** function; complex coordinate function; Fourier transformations; auto-regressive modeling; Zernike moments; nonparametric **kNN** classifier; leave-one-out cross-validation; medial diagnosis; medical image processing

Class Codes: C7330 (Biology and medical computing); C5260B (Computer vision and image processing techniques); C1250M (Image recognition)

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9/5/13 (Item 5 from file: 2)

DIALOG(R)File 2:INSPEC

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6199173 INSPEC Abstract Number: A1999-09-3310-005

Title: Method for the evaluation of normal modes and molecular mechanics with reduced sets of force constants. 1. Principles and reliability test

Author(s): Unger, E.; Lipski, R.J.; Dreybrodt, W.; Schweitzer-Stenner, R.

Author Affiliation: Inst. fur Exp. Phys., Bremen Univ., Germany

Journal: Journal of Raman Spectroscopy vol.30, no.1 p.3-28

Publisher: Wiley,

Publication Date: Jan. 1999 Country of Publication: UK

CODEN: JRSPAF ISSN: 0377-0486

SICI: 0377-0486(199901)30:1L:3:MENM;1-V

Material Identity Number: J239-1999-001

U.S. Copyright Clearance Center Code: 0377-0486/99/010003-26\$17.50

Language: English Document Type: Journal Paper (JP)

Treatment: Theoretical (T)

Abstract: A novel method was developed for molecular mechanics calculations and normal mode analysis. In this approach, the number of free parameters is strongly reduced compared with other empirical force fields. And in contrast to them is generally smaller than the number of available wavenumber values. The molecule is subdivided into local units, each of which is constituted by a distinct atom and its **nearest neighbors**. The vibrational force field is then expressed as the sum over the contributions from all local units, and each local unit's potential function is assumed to depend solely on the atomic positions within the unit. Local units often exhibit high symmetry, because each atom forms bonds which are characteristic of its valencies and hybridization state, and the bonds are therefore arranged in a symmetrical way. This local (pseudo)symmetry imposes group theoretical restrictions that reduce the number of possible interaction parameters. As suggested by ab initio results, the internal force constants of each local unit are transferable to other molecules. It is therefore possible to calculate the internal force constants of each local unit from small molecules and these are then used to calculate the potential of large molecules such as porphyrins. A series of alkanes, ethene, some homo- and heterocyclic aromatic compounds and porphyrins were analyzed. The results for the normal mode wavenumbers and their eigenvectors are comparable to those reported in the literature and to

results from DFT calculations [B3-LYP/6-31G(d)]. The force constants were close to those obtained from ab initio calculations using **local symmetry coordinates** for ethene, ethane and propane. Moreover, the above procedure reproduces very well the vibrational wavenumbers and mode compositions of aromatic compounds and porphyrins, as shown by comparison with DFT calculations. In contrast to general valence force field calculations, the number of free parameters is reduced by 40-80%. (44 Refs)

Subfile: A

Descriptors: ab initio calculations; molecular force constants; potential energy functions; vibrational modes; vibrational states

Identifiers: normal modes; molecular mechanics; reduced sets; force constants; principles; reliability test; free parameters; vibrational force field; potential function; high symmetry; valencies; hybridization state; local symmetry; local pseudosymmetry; interaction parameters; group theoretical restrictions; homocyclic aromatic compounds; heterocyclic aromatic compounds; porphyrins; normal mode wavenumbers; DFT calculations; B3-LYP/6-31G(d) calculations; **local symmetry coordinates**; ab initio calculations; vibrational wavenumbers; mode compositions; general valence force field calculations

Class Codes: A3310G (Vibrational analysis (molecular spectra)); A3520P (Molecular rotation, vibration, and vibration-rotation constants); A3120A (Ab initio calculations (atoms and molecules))

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9/5/14 (Item 6 from file: 2)

DIALOG(R)File 2:INSPEC

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6079940 INSPEC Abstract Number: A9824-6120-005

Title: Non-Cartesian coordinates for instantaneous normal mode theory of atomic liquids

Author(s): Wu-Xiong Li; Keyes, T.; Murray, R.L.; Fourkas, J.T.

Author Affiliation: Dept. of Chem., Boston Univ., MA, USA

Journal: Journal of Chemical Physics vol.109, no.20 p.9096-100

Publisher: AIP,

Publication Date: 22 Nov. 1998 Country of Publication: USA

CODEN: JCPSA6 ISSN: 0021-9606

SICI: 0021-9606(19981122)109:20L:9096:CCIN;1-A

Material Identity Number: J008-98044

U.S. Copyright Clearance Center Code: 0021-9606/98/109(20)/9096(5)/\$15.00

Document Number: S0021-9606(98)50444-8

Language: English Document Type: Journal Paper (JP)

Treatment: Theoretical (T)

Abstract: A hybrid **coordinate** system of spherical **polar coordinates** for the mutual **nearest - neighbor** pairs and Cartesian coordinates for the unpaired atoms is introduced for instantaneous normal mode (INM) analysis of atomic liquids. Densities of states (dos) calculated with the hybrid coordinates in a unit-density, supercooled Lennard-Jones liquid differ from those obtained with Cartesian coordinates, primarily at imaginary frequency. A brief discussion of coordinate dependence is presented, with an analytic treatment of the frequency moments, and it is argued that the hybrid dos are more physically meaningful. INM theory strives to relate Im omega modes to diffusion and barrier crossing, but spurious nondiffusive contributions must be removed. Hybrid coordinates yield substantially fewer Im omega indicating that some nondiffusive modes are simply Cartesian artifacts. Normalized hybrid and Cartesian Re omega dos are nearly identical, as are velocity correlation functions C(t) obtained by treating the Re omega INM as a complete set of harmonic modes. These C(t) are in fair agreement with simulation, but, notably, reach an insufficiently deep negative minimum value at too short a time. A harmonic approximation using the hybrid-translational Re omega dos, in which the hybrid modes are projected onto the center-of-mass translations of the mutual neighbor pairs plus the unpaired atoms, yields much better agreement. (20 Refs)

Subfile: A

Descriptors: diffusion; electronic density of states; Lennard-Jones potential; liquid theory; supercooling

Identifiers: nonCartesian coordinates; instantaneous normal mode theory; atomic liquids; hybrid coordinate system; spherical **polar coordinates**; mutual **nearest - neighbor** pairs; Cartesian coordinates; unpaired atoms; densities of states; supercooled Lennard-Jones liquid; coordinate dependence; analytic treatment; frequency moments; Im omega modes; diffusion; barrier crossing; nondiffusive contributions; hybrid coordinates; nondiffusive modes; Cartesian artifacts; normalized hybrid; velocity correlation functions; harmonic approximation; hybrid mode projection; mutual neighbor pairs; center-of-mass translations

Class Codes: A6120 (Classical, semiclassical, and quantum theories of liquid structure); A6610C (Diffusion and thermal diffusion in liquids)

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9/5/15 (Item 7 from file: 2)

DIALOG(R) File 2:INSPEC

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5494678 INSPEC Abstract Number: A9706-7145G-001

Title: Effect of electron-phonon interaction on a one-dimensional correlated electron system

Author(s): Sil, S.; Bhattacharyya, B.

Author Affiliation: SSMP Div., Saha Inst. of Nucl. Phys., Calcutta, India

Journal: Physical Review B (Condensed Matter) vol.54, no.20 p. 14349-54

Publisher: APS through AIP,

Publication Date: 15 Nov. 1996 Country of Publication: USA

CODEN: PRBMDO ISSN: 0163-1829

SICI: 0163-1829(19961115)54:20L.14349:EEPI;1-7

Material Identity Number: P279-97002

U.S. Copyright Clearance Center Code: 0163-1829/96/54(20)/14349(6)/\$10

Document Number: S0163-1829(96)06744-6

Language: English Document Type: Journal Paper (JP)

Treatment: Theoretical (T)

Abstract: The effect of an on-site electron-phonon (e-ph) interaction is studied within the framework of an extended Hubbard model in one dimension. We have eliminated the **local phonon coordinates** using a modified Lang-Firsov transformation and diagonalized the effective electronic Hamiltonian by a real space renormalization group technique to determine the transition from a charge density wave (CDW) state to a spin density wave (SDW) state. It turns out that the CDW phase is favored by the e-ph coupling with an appreciable band-narrowing effect. In the SDW phase the distortions produced at **nearest neighbor** sites due to the e-ph interaction become comparable to the on-site distortions while this retardation effect is negligible in the CDW phase. (14 Refs)

Subfile: A

Descriptors: charge density waves; electron-phonon interactions; Hubbard model; renormalisation; spin density waves

Identifiers: electron-phonon interaction; one-dimensional correlated electron system; extended Hubbard model; **local phonon coordinates**; modified Lang-Firsov transformation; effective electronic Hamiltonian; real space renormalization group technique; charge density wave; spin density wave; CDW phase; band-narrowing effect; SDW phase; distortions; **nearest neighbor** sites; on-site distortions; retardation effect

Class Codes: A7145G (Exchange, correlation, dielectric and magnetic functions, plasmons); A7110 (General theories and computational techniques for electron states in condensed matter); A0220 (Group theory); A6320K (Phonon-electron interactions); A7138 (Polarons and electron-phonon interactions); A7530F (Spin-density waves in magnetically ordered materials); A7145L (Charge-density-wave systems)

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9/5/16 (Item 8 from file: 2)

DIALOG(R) File 2:INSPEC

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04388739 INSPEC Abstract Number: C9306-5260B-014

Title: Connectionist model for object recognition

Author(s): You, S.D.; Ford, G.E.

Author Affiliation: Centre for Image Proces. & Integrated Comp.,
California Univ., Davis, CA, USA

Journal: Proceedings of the SPIE - The International Society for Optical
Engineering vol.1709, pt.1 p.200-7

Publication Date: 1992 Country of Publication: USA

CODEN: PSISDG ISSN: 0277-786X

U.S. Copyright Clearance Center Code: 0 8194 0874 3/92/\$4.00

Conference Title: Applications of Artificial Neural Networks III

Conference Sponsor: SPIE

Conference Date: 21-24 April 1992 Conference Location: Orlando, FL,
USA

Language: English Document Type: Conference Paper (PA); Journal Paper
(JP)

Treatment: Experimental (X)

Abstract: An application of neural networks is the recognition of objects under translation, rotation, and scale change. Most existing networks for invariant object recognition require a huge number of connections and/or processing units. The authors propose a new connectionist model for invariant object recognition for binary images with a reasonable network size. The network consists of five stages. The first stage shifts the object so that the centroid of the object coincides with the center of the image plane. The second stage is a variation of the **polar - coordinate** transformation used to obtain two N-dimensional representations of the input object. In this stage, the theta axis is represented by the positions of the output units: therefore, any rotation of the original object becomes a cyclic shift of the output values of this stage. The third stage is a variation of the Rapid transform, which provides invariant representations of cyclic-shift inputs. The next stage normalizes the outputs of the Rapid transform to obtain scale invariance. The final stage is a **nearest neighbor** classifier. The authors tested the performance of the network for character recognition and good results were obtained with only one pattern per class in training. (9 Refs)

Subfile: C

Descriptors: character recognition; invariance; neural nets

Identifiers: shift invariant transform; rapid transform; polar transform; nearest neighbour classifications network; shift network; 8*8 fixed characters; scale normalisation; object recognition; translation; rotation; scale; invariant object recognition; connectionist model; binary images; network size; **polar - coordinate** transformation; N-dimensional representations; cyclic shift; cyclic-shift inputs; **nearest neighbor** classifier; character recognition

Class Codes: C5260B (Computer vision and picture processing); C5290 (Neural computing techniques)

9/5/17 (Item 9 from file: 2)

DIALOG(R)File 2:INSPEC

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04148856 INSPEC Abstract Number: A9212-8760B-003, B9206-7510B-045

Title: New methodology to analyze time sequences of ultrasound images

Author(s): Herlin, I.L.; Ayache, N.

Issued by: Inst. Nat. Recherche Inf. Autom., Le Chesnay, France

Publication Date: Jan. 1991 Country of Publication: France 31 pp.

Report Number: 1390

Language: English Document Type: Report (RP)

Treatment: Experimental (X)

Abstract: The fact that ultrasound scan lines are acquired in **polar coordinates** creates an important anisotropy in spatial resolution. The geometric transformation (called scan correction) which transforms the data from a polar representation to the correct cartesian representation is usually applied through a **bilinear interpolation** or Bresenham's scheme. The authors show the limitations of these schemes which do not account for the varying resolution of the data, and propose an original method which consists in computing the scan-conversion with a low-pass filtering of the cartesian image applied directly to the available polar data. They then

generalize this approach to extract edges at various resolutions and show how to use these edges to track some important moving structures through a dynamic temporal sequence. This is done by combining a refined edge detection (using temporal information) with classical deformable models (snakes). (21 Refs)

Subfile: A B

Descriptors: acoustic signal processing; biomedical ultrasonics; cardiology; pattern recognition; picture processing

Identifiers: edge extraction; beating heart images; time sequences; ultrasound scan lines; **polar coordinates**; anisotropy in spatial resolution; scan-conversion; low-pass filtering; cartesian image; moving structures; dynamic temporal sequence; refined edge detection; classical deformable models; snakes

Class Codes: A8760B (Sonic and ultrasonic radiation); A0130Q (Reports, dissertations, theses); A8770E (Diagnostic methods and instrumentation); A4360 (Acoustic signal processing); B7510B (Radiation and radioactivity applications); B7820 (Sonic and ultrasonic applications); B6140C (Optical information and image processing)

9/5/18 (Item 10 from file: 2)

DIALOG(R)File 2:INSPEC

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01552198 INSPEC Abstract Number: C80024560

Title: Service counters in post offices

Author(s): Mallet, C.

Journal: Informatique et Gestion no.113 p.35-9

Publication Date: March 1980 Country of Publication: France

CODEN: IFQGAJ ISSN: 0020-062X

Language: French Document Type: Journal Paper (JP)

Treatment: Practical (P)

Abstract: A network of teleinformation for postal cheques and the national savings bank is being developed by the French **Post Office**. This will improve service to customers and the working conditions of employees. The terminals have an alpha-numeric keyboard, 6 line, 40 character VDU (very readable, non-scintillating red characters on black ground) with a quiet printer; they are connected by microprocessors to **coordinate** accounts at **local**, regional and national level. Payments, withdrawals and statement of accounts can be made at any branch in real time. 623 terminals are being installed during 1979-1981 in the Paris and Nantes regions in 414 post offices. From 1982, the 1500 main post offices throughout France will be fully connected to the network, with another 8500 post offices offering most of the services. (0 Refs)

Subfile: C

Descriptors: EFTS

Identifiers: teleinformation; postal cheques; national savings bank; French **Post Office**; VDU; microprocessors; alpha numeric keyboards; EFTS; service counters

Class Codes: C7120 (Finance)

9/5/19 (Item 1 from file: 94)

DIALOG(R)File 94:JICST-EPlus

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04985285 JICST ACCESSION NUMBER: 02A0039034 FILE SEGMENT: PreJICST-E
New Technologies in Signal Processing for Electromagnetic-wave Sensing and Imaging. Coordinate Transformation by Nearest Neighbor Interpolation for ISAR Fixed Scene Imaging.

SASAKI K (1); SHIMIZU M (1); WATANABE Y (1)

(1) Nippon Inst. Technol., Saitama-ken, Jpn

IEICE Trans Electron(Inst Electron Inf Commun Eng), 2001, VOL.E84-C,NO.12, PAGE.1905-1909

JOURNAL NUMBER: L1370AAA ISSN NO: 0916-8524

LANGUAGE: English COUNTRY OF PUBLICATION: Japan

DOCUMENT TYPE: Journal

MEDIA TYPE: Printed Publication

ABSTRACT: The reflection signal in the inverse synthetic aperture radar is measured in the **polar coordinate** defined by the object rotation angle and the frequency. The reconstruction of fixed scene images requires the **coordinate** transformation of the **polar** format data into the rectangular spatial frequency domain, which is then processed by the inverse Fourier transform. In this paper a fast and flexible method of coordinate transformation based on the **nearest neighbor** interpolation utilizing the Delauney triangulation is at first presented. Then, the induced errors in the transformed rectangular spatial frequency data and the resultant fixed scene images are investigated by simulation under the uniform plane wave transmit-receive mode over the swept frequency 120-160GHz, and the results which demonstrate the validity of the current coordinate transformation are presented. (author abst.)

9/5/20 (Item 2 from file: 94)
DIALOG(R)File 94:JICST-EPlus
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01968475 JICST ACCESSION NUMBER: 94A0261068 FILE SEGMENT: JICST-E
Hand-written Digit Recognition Using Crossing Numbers on Concentric Circles as Features.

ZHAO Q (1)

(1) Tohoku Univ., Sendai, JPN

Denshi Joho Tsushin Gakkai Gijutsu Kenkyu Hokoku(IEIC Technical Report
(Institute of Electronics, Information and Communication Engineers),
1994, VOL.93,NO.479(PRU93 130-135), PAGE.41-46, FIG.3, TBL.5, REF.9

JOURNAL NUMBER: S0532BBG

UNIVERSAL DECIMAL CLASSIFICATION: 681.3:165

LANGUAGE: English COUNTRY OF PUBLICATION: Japan

DOCUMENT TYPE: Journal

ARTICLE TYPE: Original paper

MEDIA TYPE: Printed Publication

ABSTRACT: To recognize characters involed in engineering drawings, recognition that is invariant to transforms such as shift, rotation and scale is required. For this purpose, many transform invariant features have been proposed and investigated in the literature. However, expression and extraction of these features are usually too complex to be adapted to neural network based pattern recognition. This paper studies the efficiency of crossing numbers on some concentric circles when they are used as features for recognition of handwritten digits. Clearly, these features are trainform invariant. In addition, it is shown by experiment that they are also stable when the digits are distorted to some extent. In the experiment, 40 ordinarily written samples are given for each pattern(0-9). The mean values of features can recognize more than 80% samples using template-matching, and all samples can be classified correctly using about 1/6 to 1/5 samples as representatives, if we use the **nearest neighbor** method. (author abst.)

DESCRIPTORS: handwritten character recognition; feature extraction; numerical character; invariant; pattern classification; **polar coordinate** ; Fourier transformation; neural network

BROADER DESCRIPTORS: character recognition; figure pattern recognition; pattern recognition; recognition; extraction; separation; letter; classification; coordinate; integral transformation; mathematical transformation; mapping(mathematics); transformation and conversion; network

CLASSIFICATION CODE(S): JE07000S

9/5/21 (Item 1 from file: 6)
DIALOG(R)File 6:NTIS
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2179731 NTIS Accession Number: ADA381103/XAB
Analysis of Interval Changes on Mammograms for Computer Aided Diagnosis
(Annual summary rept. 6 Apr 1998-5 Apr 1999)

Hadjiiski, L. X.
Michigan Univ., Ann Arbor.
Corp. Source Codes: 002797000; 228600
May 1999 49p
Languages: English
Journal Announcement: USGRDR0025

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located at 5285 Port Royal Road, Springfield, VA, 22161, USA.

NTIS Prices: PC A04/MF A01

Country of Publication: United States

Contract No.: DAMD17-98-1-8211

The goal of this research is to develop a novel technique for computerized analysis of temporal differences between the most recent and previous mammograms of the same view in order to evaluate the usefulness of using interval change to distinguish between normal structures, benign masses, and malignant masses in computer-aided diagnosis (CAD). During this year, we have developed a multistage regional registration technique that combines global and local alignment procedures for identifying masses on temporal pairs of mammograms. In the first stage, the breast images from the current and previous mammograms were globally aligned by maximizing a mutual information measure. In the second stage a fan-shape **search** region based on **polar coordinates** was estimated on the previous mammogram. In the third stage a **search** for the **best match** between the lesion template from the current mammogram and a structure on the previous mammogram was carried out within the fan-shape region. We found that in 85% of the cases the corresponding regions on the previous and current mammogram were correctly identified. This technique can be useful for identification of corresponding lesions on temporal pairs of mammograms.

Descriptors: *Computer aided diagnosis; *Breast cancer; Neoplasms; Diagnosis(Medicine); Images; Templates; Computer applications; Lesions; Mammary glands; Mammography

Identifiers: NTISDODXA

Section Headings: 57E (Medicine and Biology--Clinical Medicine); 95C (Biomedical Technology and Human Factors Engineering--Biomedical Instrumentation and Bioengineering)

9/5/22 (Item 1 from file: 144)
DIALOG(R)File 144:Pascal
(c) 2002 INIST/CNRS. All rts. reserv.

13780802 PASCAL No.: 98-0494543

Non-Cartesian coordinates for instantaneous normal mode theory of atomic liquids

LI Wu-Xiong; KEYES T; MURRY Robert L; FOURKAS John T
Chemistry Department, Boston University, Boston, Massachusetts 02115;
Eugene F. Merkert Chemistry Center, Boston College, Chestnut Hill,
Massachusetts 02167

Journal: The Journal of chemical physics, 1998-11-22, 109 (20) 9096-9100

ISSN: 0021-9606 CODEN: JCPSA6 Availability: INIST-127

Document Type: P (Serial) ; A (Analytic)

Country of Publication: United States

Language: English

A hybrid **coordinate** system of spherical **polar coordinates** for the mutual **nearest - neighbor** pairs and Cartesian coordinates for the unpaired atoms is introduced for instantaneous normal mode (INM) analysis of atomic liquids. Densities of states (dos) calculated with the hybrid coordinates in a unit-density, supercooled Lennard-Jones liquid differ from those obtained with Cartesian coordinates, primarily at imaginary frequency. A brief discussion of coordinate dependence is presented, with an analytic treatment of the frequency moments, and it is argued that the hybrid dos are more physically meaningful. INM theory strives to relate Im omega modes to diffusion and barrier crossing, but spurious nondiffusive contributions must be removed. Hybrid coordinates yield substantially fewer Im omega indicating that some nondiffusive modes are simply Cartesian artifacts. Normalized hybrid and Cartesian Re omega dos are nearly

identical, as are velocity correlation functions $C(t)$ obtained by treating the Re omega INM as a complete set of harmonic modes. These $C(t)$ are in fair agreement with simulation, but, notably, reach an insufficiently deep negative minimum value at too short a time. A harmonic approximation using the hybrid-translational Re omega dos, in which the hybrid modes are projected onto the center-of-mass translations of the mutual neighbor pairs plus the unpaired atoms, yields much better agreement. (c) 1998 American Institute of Physics.

English Descriptors: Theoretical study; Liquid theory; Diffusion;
Electronic density of states; Lennard-Jones potential; Supercooling

French Descriptors: 6120; 6610C; Etude theorique; Theorie liquides;
Diffusion(transport); Densite etat electron; Potentiel Lennard Jones;
Surfusion

Classification Codes: 001B60A20; 001B60F10C

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9/5/23 (Item 2 from file: 144)

DIALOG(R)File 144:Pascal

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13068757 PASCAL No.: 97-0359520

Definition of a 4D continuous polar transformation for the tracking and the analysis of LV motion : Segmentation and deformable models

CVRMeD-MRCAS '97 : Grenoble, March 19-22, 1997

DECLERCK J; FELDMAR J; AYACHE N

TROCCAZ Jocelyne, ed; GRIMSON Eric, ed; MOSGES Ralph, ed

INRIA, B.P. 93, 06 902 Sophia Antipolis, France

Computer vision, virtual reality and robotics in medicine and medical robotics and computer-assisted surgery. Joint conference, 1 (Grenoble FRA) 1997-03-19

Journal: Lecture notes in computer science, 1997, 1205 33-42

ISSN: 0302-9743 Availability: INIST-16343; 354000062515410040

No. of Refs.: 20 ref.

Document Type: P (Serial); C (Conference Proceedings) ; A (Analytic)

Country of Publication: Germany; United States

Language: English

A 4D polar transformation is defined to describe the left ventricle (LV) motion and a method is presented to estimate it from sequences of 3D images. The transformation is defined in 3D-planispheric coordinates by a small number of parameters involved in a set of simple linear equations. It is continuous and regular in time and space, periodicity in time can be imposed. The local motion can be easily decomposed into a few canonical motions (centripetal contraction, rotation around the long-axis, elevation). To recover the motion from original data, the 4D polar transformation is calculated using an adaptation of the Iterative **Closest Point** algorithm. We present the mathematical framework and a demonstration of its feasibility on a gated SPECT sequence.

English Descriptors: Medical imagery; Motion study; Left ventricle performance; Circulatory system; Human; **Polar coordinate** ; Tridimensional image; Transformation of coordinates; Algorithm performance; Iterative method; Feasibility; Emission tomography; Photon Broad Descriptors: Biomedical data processing; Radionuclide study; Informatique biomedicale; Exploration radioisotopique; Informatica biomedical; Exploracion radioisotopica

French Descriptors: Imagerie medicale; Etude mouvement; Fonction ventriculaire gauche; Appareil circulatoire; Homme; Coordonnee polaire; Image tridimensionnelle; Changement coordonnee; Performance algorithmique; Methode iterative; Faisabilite; Tomoscintigraphie; Photon; Systeme 4 dimensions

Classification Codes: 002B24B04

9/5/24 (Item 1 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci
(c) 2002 Inst for Sci Info. All rts. reserv.

10420425 Genuine Article#: 524CY Number of References: 32
Title: An efficient indexing method for nearest neighbor searches in high-dimensional image databases

Author(s): Cha GH (REPRINT) ; Zhu XM; Petkovic D; Chung CW
Corporate Source: Tonymyong Univ Informat Technol, Dept Multimedia
Engn, Pusan 608711//South Korea/ (REPRINT); Tonymyong Univ Informat
Technol, Dept Multimedia Engn, Pusan 608711//South Korea/; eLance
com, Sunnyvale//CA/94086; Korea Adv Inst Sci & Technol, Dept Comp
Sci, Taejon 305701//South Korea/; IBM Corp, Almaden Res Ctr, San
Jose//CA/95120

Journal: IEEE TRANSACTIONS ON MULTIMEDIA, 2002, V4, N1 (MAR), P76-87

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NEW YORK, NY 10017-2394 USA

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Journal Subject Category: COMPUTER SCIENCE, INFORMATION SYSTEMS; COMPUTER
SCIENCE, SOFTWARE ENGINEERING; TELECOMMUNICATIONS

Abstract: Nearest neighbor (NN) search is emerging as an important search paradigm in a variety of applications in which objects are represented as **vectors** of d numeric features. However, despite decades of efforts, except for the filtering approach such as the VA-file [31], the current solutions to find exact kNNs are far from satisfactory for large d. The filtering approach represents **vectors** as compact approximations and by first scanning these smaller approximations, only a small fraction of the real **vectors** are visited. In this paper, we introduce the **local polar coordinate file (LPC-file)** using the filtering approach for **nearest - neighbor searches** in high-dimensional image databases. The basic idea is to **partition the vector space** into rectangular **cells** and then to approximate **vectors** by **polar coordinates** on the partitioned **local** cells. The LPC information significantly enhances the discriminatory power of the approximation. To demonstrate the effectiveness of the LPC-file, we conducted extensive experiments and compared the performance with the VA-file and the sequential scan by using synthetic and real data sets. The experimental results demonstrate that the LPC-file outperforms both of the VA-file and the sequential scan in total elapsed time and in the number of disk accesses and that the LPC-file is robust in both "good" distributions (such as random) and "bad" distributions (such as skewed and clustered).

Descriptors--Author Keywords: dimensionality curse ; image database ;
indexing method ; **nearest neighbor (NN) search**

Identifiers--KeyWord Plus(R): ALGORITHM; TREE

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9/5/25 (Item 1 from file: 266)

DIALOG(R) File 266:FEDRIP

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00174495

IDENTIFYING NO.: 0100539 AGENCY CODE: NSF

Orthogonal Polynomials of Several Variables

PRINCIPAL INVESTIGATOR: Dunkl, Charles F

PERFORMING ORG.: University of Virginia Main Campus, Mathematics,
 Charlottesville, VA 22904-4137

PROJECT MONITOR: Khavinson, Dmitry

SPONSORING ORG.: National Science Foundation, DMS, 4201 Wilson Boulevard
 , Arlington, Virginia 22230

DATES: 20010701 TO 20040630 FY : 2001 FUNDS: \$158,380 (100000)

SUMMARY: The analysis of multi-variable functions or configurations is an important problem area with connections to topics like quantum systems of many bodies, multi-variate statistical distributions, special functions, numerical cubature, and algebraic combinatorics. The common thread of the problems posed in this proposal is the existence of a symmetry group. An important class of applications, for example, is formed by the Calogero-Sutherland-Moser (CSM) systems; these are quantum-mechanical problems of a number of identical particles in a one- **dimensional space** with certain interactions (inverse square, for one). The symmetry group is the group of all permutations of the coordinate functions (the type-A Weyl group) or the group of permutations and sign-changes (the type-B Weyl group); the latter occurs in spin models. Some of the classical orthogonal polynomials are associated to Weyl groups and compact homogeneous spaces. Dunkl has developed a theory of differential-difference operators (called "Dunkl operators" in both mathematics and physics literature) which are crucial devices for this analysis. These operators are a parametrized version of the usual derivatives. They are used to construct certain invariant differential operators (which prove the complete integrability of several CSM models). There is also an associated generalization of the Fourier transform. Specifically this project concerns the construction of generating functions for polynomials with certain desirable properties (orthogonality or eigenfunctions, for example) associated to finite reflection groups (of types I, A, B, H); a study of the generalized binomial coefficients defined in terms of nonsymmetric Jack polynomials, a **search** for useful self-adjoint operators enabling orthogonal decomposition of type-B harmonic polynomials (which would be used to express wave-functions of CSM models on the line in spherical **polar coordinates**), a study of special CSM models with three-body interactions. Also it is proposed to investigate possible modifications of the original differential-difference operators connected with bispectral problems or super-integrable models. Mathematical analysis can be considered as having two different emphases, one is to find exact formulae to describe some mathematical system, like the motion of the planets or of a pendulum, or an electron belonging to an atom which is part of a crystal, and the other is to find good and useful approximations and processes which can get as close

as desired to the solution of a problem by taking an adequate number of steps. For example, computed tomography does not give a perfect image of a cross-section of the subject, but it does provide all the detail needed for practical purposes. This project is in the part of analysis which aims to give exact solutions in situations which enjoy some symmetry. This could be the quantum-mechanical problem of indistinguishable particles, a statistical analysis which treats each data point the same way, or the molecular structure of a crystal where each atom has six **nearest neighbors**, up, down, left, right, front and back. In particular, Dunkl has developed a calculus which takes the symmetry into account, thus allowing precise and powerful techniques for the analysis. The problems in the proposal can be categorized by the types of symmetry, such as those formed by rotating a circle through multiples of sixty degrees (that is, one sixth of a complete revolution), or those associated to permutations of identical objects, to name just two. The goal of the project is to develop tools and discover methods for multi-variable analysis of problems with symmetry; these will be useful in understanding the physics of interacting particles, statistical analysis of complicated data, and the techniques of digitizing and the subsequent reconstruction of sounds and images.

13/5/1 (Item 1 from file: 108)
DIALOG(R)File 108:AEROSPACE DATABASE
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02583460 A01-37581

Estimation of timber volume at the sample plot level by means of image segmentation and Landsat TM imagery

Makela, Helena; Pekkarinen, Anssi (Finnish Forest Research Inst., Helsinki, Finland)

Remote Sensing of Environment (ISSN 0034-4257), vol. 77, no. 1, July 191, p. 66-75.

Jul. 2001 30 REFS.

LANGUAGE: English

COUNTRY OF ORIGIN: Finland COUNTRY OF PUBLICATION: United States

DOCUMENT TYPE: JOURNAL ARTICLE

DOCUMENTS AVAILABLE FROM AIAA Technical Library

JOURNAL ANNOUNCEMENT: IAA0110

The use of image segments in the feature extraction for the estimation of timber volumes using a TM image was investigated by applying the k **nearest neighbor** estimation method (**knn**) and Finnish National Forest Inventory (NFI) sample plots. The estimates of the volumes by tree species at the plot level were derived by means of the cross-validation technique. Ten **nearest neighbors** (NNs) were applied in the estimation. Image **segments** were derived by two different methods: (1) a measurement **space** -guided clustering followed by the connected component labeling (ISOCCL) and (2) a directed trees algorithm (NG). The segmentations were fine-tuned by means of two different region-merging algorithms. The spectral features were extracted in two ways: from a fixed window (FW) around the field sample plot, and from those pixels within the FW that belonged to the same segment as the sample plot pixel. Window sizes from 1 to 11 x 11 pixels were tested, and the average of the extracted pixel values was used in the estimation. Features from the ISOCCL-based segments gave the best estimates for the volumes of pine and spruce, as well as for the total volume. Best estimates for the volume of broad-leaved trees were obtained from NG-based segments. Compared to the estimates of the FW approach, the improvements were, however, quite small and relative rms errors remained high (Author)

DESCRIPTORS: *REMOTE SENSING; *TIMBER INVENTORY; *THEMATIC MAPPERS (LANDSAT); *IMAGE SEGMENTATION; *SATELLITE IMAGERY; FORESTS; FINLAND; ALGORITHMS; PIXELS

SUBJECT CLASSIFICATION: 8743 Earth Resources & Remote Sensing (1987-)

13/5/2 (Item 2 from file: 108)
DIALOG(R)File 108:AEROSPACE DATABASE
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02436591 N99-28339

Near - Neighbor Calculations Using a Modified Cell-Linked List Method

Mattson, William (); Rice, Betsy M. ()

NASA no. 19990101883.

Jun.

REPORT NO.: NASA no. 19990101883; AD-A364892; ARL-TR-1956

LANGUAGE: English

COUNTRY OF PUBLICATION: United States

DOCUMENT TYPE: REPORT

DOCUMENTS AVAILABLE FROM AIAA Technical Library

JOURNAL ANNOUNCEMENT: STAR9901

We have modified the conventional cell-linked list method to reduce the number of unnecessary internuclear distance calculations in molecular simulations of systems containing many particles. In the conventional method, the simulation **space** is **partitioned** into **cells** with edge lengths no less than the cutoff distance of the interaction potential (r sub cut). The atoms are assigned to cells according to their spatial positions, and all internuclear distances for atoms within a cell and atoms in the same and **nearest neighbor** cells are evaluated. While this method ensures that the internuclear separation between all atom pairs within (r sub cut) is calculated, it allows for unnecessary internuclear distance calculations between pairs that are within the volume encompassing the

neighbor cells but that are separated by more than ($r_{sub cut}$). The modified method presented here allows for reductions in the cell sizes and the number of atoms within the volume encompassing the neighbor cells. These reductions decrease the number of atoms that are outside of the interaction range and the number of unnecessary internuclear distance calculations while ensuring that all internuclear distances within the cutoff range are evaluated. We present algorithms to determine the volume with the minimum number of neighbor cells as a function of cell size and the identities of the neighboring cells. We also evaluate the serial performance using the modified form as functions of cell size and particle density for comparison with the performance using the conventional cell-linked list method

DESCRIPTORS: *INTERNUCLEAR PROPERTIES; *MOLECULAR STRUCTURE; *MOLECULAR DYNAMICS; *ATOMIC ENERGY LEVELS; *ALGORITHMS; LENNARD-JONES POTENTIAL; PARTICLE DENSITY (CONCENTRATION)

SUBJECT CLASSIFICATION: 7572 Atomic & Molecular Physics (1975-)

13/5/3 (Item 3 from file: 108)

DIALOG(R) File 108:AEROSPACE DATABASE

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01713870 N87-29825

Neural network representation of sensor graphs in autonomous robot path planning

JORGENSEN, C. C.

Oak Ridge National Lab., TN.

CORPORATE CODE: OA789470

1987 9P.

PRESENTATION NOTE: Presented at the 1st IEEE International Conference on Neural Networks, San Diego, Calif., 21 Jun. 1987

REPORT NO.: DE87-011125; CONF-8706130-1

CONTRACT NO.: DE-AC05-84OR-21400

LANGUAGE: English

COUNTRY OF ORIGIN: United States COUNTRY OF PUBLICATION: United States

DOCUMENT TYPE: CONFERENCE PAPER

DOCUMENTS AVAILABLE FROM AIAA Technical Library

OTHER AVAILABILITY: CASI HC A02/MF A01

JOURNAL ANNOUNCEMENT: STAR8724

This paper discusses a continuous valued associative neural network used for anticipatory robot navigation planning in partially learned environments. A navigation methodology is implemented in four steps. First, a room is represented as a lattice of connected voxels formed by **dividing** navigation **space** into equal sized volumetric **cells**. Each voxel is associated with a simulated neuron. The magnitude of a neurons activation corresponds to a probability of voxel occupancy calculated from a series of sonar readings taken by an autonomous robot. Neurons are trained with a series of room patterns derived from varying robot sensor perspectives. At another time, the robot is exposed to a single perspective of one of the rooms and utilizes the sensor return as a cue to prompt associative recall of a best guess of the complete interior of the room. A two step path planning operation is then invoked which uses line of sight readings and anticipated global information to form a trial path plan. The planning process merges a **nearest neighbor** grid cell technique and a simulated annealing gradient descent method to optimize traversal movements. In the final step, the path is followed until a mismatch between the estimated room and the actual sensor returns indicate incorrect anticipation. Implementation of the method on a Hypercube computer is discussed along with memory computation tradeoff requirements (DOE)

SOURCE OF ABSTRACT/SUBFILE: DOE

DESCRIPTORS: *ARCHITECTURE (COMPUTERS); *ARTIFICIAL INTELLIGENCE; *COMPUTER NETWORKS; *COMPUTERIZED SIMULATION; *NAVIGATION; *NEURAL NETS; *ROBOT CONTROL; *ROBOTS; *SUPERCONDUCTING DEVICES; *TRAJECTORY PLANNING; AUTONOMY; GRAPHS (CHARTS); REMOTE SENSING; SIMULATED ANNEALING; SONAR; SUPERCOMPUTERS; TOPOLOGY

SUBJECT CLASSIFICATION: 7537 Mechanical Engineering (1975-)

13/5/4 (Item 1 from file: 8)
DIALOG(R)File 8: Ei Compendex(R)
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05783251 E.I. No: EIP01025530540

Title: Fast fractal compression of greyscale images
Author: Cardinal, Jean
Corporate Source: Brussels Free Univ, Brussels, Belgium
Source: IEEE Transactions on Image Processing v 10 n 1 Jan 2001. p 159-164

Publication Year: 2001
CODEN: IIPRE4 ISSN: 1057-7149
Language: English
Document Type: JA; (Journal Article) Treatment: T; (Theoretical)
Journal Announcement: 0103W3

Abstract: A new algorithm for fractal compression of greyscale images is presented. It uses some previous results allowing the compression process to be reduced to a **nearest neighbors** problem, and is essentially based on a geometrical **partition** of the image **block** feature **space**. Experimental comparisons with previously published methods show a significant improvement in speed with no quality loss. (Author abstract) 10 Refs.

Descriptors: *Image compression; Fractals; Image coding; Algorithms; Image analysis; Image quality
Identifiers: Greyscale images
Classification Codes:
723.2 (Data Processing)
723 (Computer Software); 921 (Applied Mathematics)
72 (COMPUTERS & DATA PROCESSING); 92 (ENGINEERING MATHEMATICS)

13/5/5 (Item 2 from file: 8)
DIALOG(R)File 8: Ei Compendex(R)
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05146123 E.I. No: EIP98114436296

Title: On plastic deformation and the dynamics of 3D dislocations
Author: Zbib, Hussein M.; Rhee, Moono; Hirth, John P.
Corporate Source: Washington State Univ, Pullman, WA, USA
Source: International Journal of Mechanical Sciences v 40 n 2-3 Feb-Mar 1998. p 113-127

Publication Year: 1998
CODEN: IMSCAW ISSN: 0020-7403
Language: English
Document Type: JA; (Journal Article) Treatment: T; (Theoretical)
Journal Announcement: 9812W4

Abstract: A three-dimensional (3D) mesoscopic model to simulate the collective dynamic behavior of a large number of curved dislocations of finite lengths has been developed for the purpose of analyzing deformation patterns and instabilities, including the formation of dislocation cell structures. Each curved dislocation is approximated by a piecewise continuous array of straight line segments. The interactions among the segments, including line-tension and self-interactions, are treated explicitly. For longer-range interactions, the **space** is **divided** into a regular cellular array and the elastic **fields** of the dislocations in a remote cell approximated by a multipolar expansion, leading to an order N algorithm for the description of a cell containing N dislocations. For large arrays, the simulation volume is divided into cubical cells. A discrete random starting array is selected for the master cell and its **nearest neighbors**, which constitute an order 2 cell. Reflection boundary conditions are imposed for **near - neighbor** order 2 cells and so forth, creating an NaCl-type lattice array. The boundaries between the cells are considered to be relaxed grain boundaries. That is, recovery within the boundaries and rotation across them are considered to occur so that the boundaries have no associated elastic fields. This cell hierarchy, coupled with the multipole expansion, is suitable for the use of massively parallel computation, with individual cells assigned to separate processors. (Author abstract) 29 Refs.

Descriptors: *Plastic deformation; Polycrystalline materials;
Dislocations (crystals); Elasticity; Grain boundaries; Mathematical models;
Boundary conditions; Algorithms
Identifiers: Curved dislocations
Classification Codes:
933.1.1 (Crystal Lattice)
931.1 (Mechanics); 933.1 (Crystalline Solids)
421 (Materials Properties); 931 (Applied Physics); 933 (Solid State
Physics); 921 (Applied Mathematics)
42 (MATERIALS PROPERTIES & TESTING); 93 (ENGINEERING PHYSICS); 92
(ENGINEERING MATHEMATICS)

13/5/6 (Item 3 from file: 8)
DIALOG(R) File 8: Ei Compendex(R)
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04884766 E.I. No: EIP97123946862

**Title: Vector quantization algorithm based on the nearest neighbor
of the furthest color**

Author: Tremeau, Alain; Charrier, Christophe; Cherifi, Hocine

Corporate Source: Universite Jean Monnet, Saint-Etienne, Fr

Conference Title: Proceedings of the 1997 International Conference on
Image Processing. Part 3 (of 3)

Conference Location: Santa Barbara, CA, USA Conference Date:
19971026-19971029

Sponsor: IEEE

E.I. Conference No.: 47482

Source: IEEE International Conference on Image Processing v 3 1997. IEEE
Comp Soc, Los Alamitos, CA, USA, 97CB36144. p 682-685

Publication Year: 1997

CODEN: 85QTAW

Language: English

Document Type: CA; (Conference Article) Treatment: T; (Theoretical)

Journal Announcement: 9801W4

Abstract: In order to optimize the codebook used by the **Vector**
Quantization compression scheme, we have developed a process based on the
max-min algorithm. This process optimizes color **space partitioning** from
vector blocks selected iteratively within the training set according to
three algorithms. The partitioning algorithm is based on the **nearest**
neighbor query. The selection algorithm **search** the furthest color of
the nearest **vector** block of the training set already computed. A centroid
process generates the codebook in refining the **vector** block selection. In
order to counterbalance cases of study for which the centroid process
modifies the **vector** block selection, we have introduced three tests.
These tests restrict the training set from which representative colors can
be selected. (Author abstract) 4 Refs.

Descriptors: **Vector** quantization; Algorithms; Color image processing;
Iterative methods; Image segmentation; Optimization

Identifiers: Max min algorithms; Color space partitioning; **Nearest
neighbor query**

Classification Codes:

921.1 (Algebra); 741.1 (Light/Optics); 921.6 (Numerical Methods);
921.5 (Optimization Techniques)

921 (Applied Mathematics); 723 (Computer Software); 741 (Optics &
Optical Devices)

92 (ENGINEERING MATHEMATICS); 72 (COMPUTERS & DATA PROCESSING); 74
(OPTICAL TECHNOLOGY)

13/5/7 (Item 4 from file: 8)
DIALOG(R) File 8: Ei Compendex(R)
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04610732 E.I. No: EIP97013506596

**Title: Deformable model application on segmentation in 3-D
echocardiography**

Author: Linares, Pedro; Torrealba, Victor; Montilla, Guillermo; Bosnjak,

Antonio; Jimenez, Carlos; Barrios, Victor
Corporate Source: Universidad de Carabobo, Valencia, Venez
Conference Title: Proceedings of the 1996 23rd Annual Meeting on
Computers in Cardiology
Conference Location: Indianapolis, IN, USA Conference Date:
19960908-19960911
Sponsor: IEEE
E.I. Conference No.: 46018
Source: Computers in Cardiology 1996. IEEE, Los Alamitos, CA,
USA, 96CB36012. p 413-416
Publication Year: 1996
CODEN: COCADX ISSN: 0276-6574
Language: English
Document Type: CA; (Conference Article) Treatment: A; (Applications); T
; (Theoretical)
Journal Announcement: 9703W3

Abstract: This work presents 3D cardiac images rendering based on
volumetric of plane sections obtained from the cardiac wall segmentation.
This work introduces a non-rigid model based on physics as a segmentation
method. An object is constructed in the shape of a polygon of n vertices,
with masses on each of them, interconnected with springs to each other. The
model is deformed when exposed to a force field that moves it toward the
desired contour. In order to obtain the volumetric reconstructed rendering
of the ventricular cavity, the method was used on a series of apical views
of the heart of a healthy person. The views belong to radial **sections**
(equally **spaced** in angle) which, after **segmentation**, and by means of a
bilinear interpolation process, permitted the reconstruction of a 3D
image of the ventricular cavity. (Author abstract) 10 Refs.

Descriptors: *Echocardiography; Image segmentation; Three dimensional;
Computer simulation; Physics; Interpolation
Identifiers: Cardiac wall segmentation; Ventricular cavity
Classification Codes:
461.6 (Medicine); 723.2 (Data Processing); 723.5 (Computer
Applications); 921.6 (Numerical Methods)
461 (Biotechnology); 723 (Computer Software); 921 (Applied
Mathematics)
46 (BIOENGINEERING); 72 (COMPUTERS & DATA PROCESSING); 92 (ENGINEERING
MATHEMATICS)

13/5/8 (Item 5 from file: 8)
DIALOG(R) File 8: Ei Compendex(R)
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04362402 E.I. No: EIP96033103198
Title: **2D object segmentation from fovea images based on eigen-subspace
learning**
Author: Cui, Yuntao; Weng, John
Corporate Source: Michigan State Univ, East Lansing, MI, USA
Conference Title: International Symposium on Computer Vision, ISCV'95,
Proceedings
Conference Location: Coral Gables, FL, USA Conference Date:
19951121-19951123
Sponsor: IEEE
E.I. Conference No.: 44401
Source: Proceedings of the IEEE International Conference on Computer
Vision 1995. IEEE, Piscataway, NJ, USA, 95TB100006. p 305-310
Publication Year: 1995
CODEN: PICVES
Language: English
Document Type: CA; (Conference Article) Treatment: A; (Applications); T
; (Theoretical); X; (Experimental)
Journal Announcement: 9605W2

Abstract: In this paper, we consider the problem of segmenting 2D objects
from intensity fovea images based on learning. During the training, we
apply the Karhunen-Loeve projection to the training set to obtain a set of
eigen- **vectors** and also construct a space decomposition tree to achieve
logarithmic retrieval time complexity. The eigenvectors are used to

reconstruct the test fovea image. Then we apply a spring network model to the reconstructed image to generate a polygon mask. After applying the mask to the test image, we **search** the **space** decomposition tree to find the **nearest neighbor** to **segment** the object from background. The system is tested to segment 25 classes of different hand shapes. The experimental results show 97% correct rate for the hands presented in the training (because of the background effect) and 93% correct rate for the hands that have not been used in the training phase. (Author abstract) 20 Refs.

Descriptors: *Image segmentation; Object recognition; Eigenvalues and eigenfunctions; Learning systems; Image reconstruction; Computational geometry; Data structures; Mathematical models; Computer simulation

Identifiers: Object segmentation; Fovea images; Space decomposition tree; Logarithmic retrieval time complexity; Karhunen-Loeve projection; Two dimensional; Polygon mask; Eigen-subspace learning; Spring network model

Classification Codes:

723.2 (Data Processing); 723.5 (Computer Applications); 921.1 (Algebra); 723.4 (Artificial Intelligence); 921.4 (Combinatorial Mathematics, Includes Graph Theory, Set Theory)

723 (Computer Software); 741 (Optics & Optical Devices); 921 (Applied Mathematics)

72 (COMPUTERS & DATA PROCESSING); 74 (OPTICAL TECHNOLOGY); 92 (ENGINEERING MATHEMATICS)

13/5/9 (Item 6 from file: 8)

DIALOG(R) File 8: Ei Compendex(R)

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03626700 E.I. No: EIP93030723300

Title: Incidence and nearest - neighbor problems for lines in 3-space

Author: Pellegrini, Marco

Corporate Source: Int Computer Science Inst, Berkeley, CA, USA

Conference Title: Eighth Annual Symposium On Computational Geometry

Conference Location: Berlin, Ger Conference Date: 19920610

Sponsor: ACM

E.I. Conference No.: 17866

Source: Eighth Annual Symposium On Computational Geometry Eighth Annu Symp Comput Geom 1992. Publ by ACM, New York, NY, USA. p 130-137

Publication Year: 1992

ISBN: 0-89791-517-8

Language: English

Document Type: CA; (Conference Article) Treatment: T; (Theoretical); A; (Applications)

Journal Announcement: 9306W4

Abstract: In the first part of the paper we solve the problem of detecting efficiently if a **query** simplex is collision-free among polyhedral obstacles. In order to solve this problem we develop new on-line data structures to detect intersections of **query** halfplanes with sets of lines and segments. In the second part we consider the **nearest - neighbor** problems. Given a set of n lines in 3- **space**, the shortest vertical **segment** between any pair of lines is found in randomized expected time $O(n^{**8**/**5**} \text{ plus } ** \text{ epsilon })$ for every epsilon greater than 0. The longest connecting vertical segment is found in time $O(n^{**4**/**3**} \text{ plus } ** \text{ epsilon })$. The shortest connecting segment is found in time $O(n^{**5**/**3**} \text{ plus } ** \text{ epsilon })$. (Author abstract) refs.

Descriptors: *Geometry; Computational complexity; Data structures

Identifiers: **Nearest - neighbor** problems; Computational geometry

Classification Codes:

921.4 (Combinatorial Mathematics, Includes Graph Theory, Set Theory); 721.1 (Computer Theory, Includes Formal Logic, Automata Theory, Switching Theory, Programming Theory); 723.2 (Data Processing)

921 (Applied Mathematics); 721 (Computer Circuits & Logic Elements); 723 (Computer Software)

92 (ENGINEERING MATHEMATICS); 72 (COMPUTERS & DATA PROCESSING)

13/5/10 (Item 7 from file: 8)

DIALOG(R) File 8: Ei Compendex(R)

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00881718 E.I. Monthly No: EI7910079892 E.I. Yearly No: EI79052361
Title: TWO-DIMENSIONAL XY MAGNETS WITH ANNEALED NON-MAGNETIC IMPURITIES.
Author: Berker, A. N.; Nelson, David R.
Corporate Source: Harvard Univ, Cambridge, Mass
Source: Journal of Applied Physics v 50 n B3 Mar 01 1979 p 1799-1801
Publication Year: 1979
CODEN: JAPIAU ISSN: 0021-8979
Language: ENGLISH
Journal Announcement: 7910

Abstract: The global phase diagram of a vectorial generalization of the Blume-Emery-Griffiths model is obtained using Migdal's approximate renormalization procedure. Classical two-component spins and non-magnetic impurities populate a triangular lattice, with **nearest - neighbor** interactions. The phase diagram in thermodynamic **field space** is **divided** into magnetic and impurity-rich phases by a first-order surface of discontinuous impurity concentrations, terminating in an Ising-type critical line. The magnetic region is further divided into a high-temperature paramagnetic phase and a low-temperature Kosterlitz-Thouless phase. The exponent $\nu = 1/4$ of the pure system is preserved at the higher-order surface separating these two phases. This surface terminates in a line of critical end-points on the first-order surface, and, consequently, no tricritical point occurs for any values of the model parameters. However, the Ising critical line and the line of critical end-points approach each other in a certain limit, yielding an effective tricritical phase diagram. Within the Kosterlitz-Thouless phase, lines of constant ν bunch together as the effective tricritical point is approached, in apparent agreement with tricritical scaling. This is also a model for superfluidity and phase separation in helium films.

Descriptors: *MAGNETIC MATERIALS--*Impurities

Classification Codes:

708 (Electric & Magnetic Materials)

70 (ELECTRICAL ENGINEERING)

13/5/11 (Item 1 from file: 35)

DIALOG(R)File 35:Dissertation Abs Online

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01531121 ORDER NO: AAD97-06495

TOWARDS A LEARNING SYSTEM FOR ROBOT HAND-EYE COORDINATION (MACHINE VISION, ARTIFICIAL INTELLIGENCE)

Author: HOWDEN, SALLY JEAN

Degree: PH.D.

Year: 1996

Corporate Source/Institution: MICHIGAN STATE UNIVERSITY (0128)

Source: VOLUME 57/09-B OF DISSERTATION ABSTRACTS INTERNATIONAL.

PAGE 5749. 195 PAGES

Descriptors: COMPUTER SCIENCE ; ENGINEERING, ELECTRONICS AND ELECTRICAL ; ARTIFICIAL INTELLIGENCE

Descriptor Codes: 0984; 0544; 0800

Through careful consideration of the Hand-Eye Coordination (HEC) problem, it can be viewed as the process of performing a sequence of transformations from an input space to an output space. Specifically, the entire process from eye to hand can be viewed as a mapping from scene space to arm configuration space. This single mapping may be broken into a sequence of mappings from one space to another. The sequence we have chosen to model is the following: scene space to image space; image space to camera coordinate system; camera coordinate system to arm/world coordinate system; arm/world coordinate system to arm configuration space. Additionally, an active vision system is incorporated which introduces an image space to head configuration space mapping.

Given the view that these subtasks are mappings from a **N - dimensional** input **space** to a **M - dimensional** output **space**, this research presents a unified framework by which the various subtasks of the HEC problem may be implemented. This framework uses a recursive

partitioning algorithm to build a hierarchical tree classifier which uses a **nearest neighbor** classification based on the Voronoi tessellation as its decision making criteria. The resulting data structure is a Recursive Partition Tree (RPT), which is the heart of the framework. The topology of the RPT is not determined a priori, or hand-coded. Instead the topology is allowed to develop during its construction, based on the given set of training samples and the order in which they are presented to the construction algorithm. Each node of the RPT represents a **cell** of the **space** which is further **partitioned** by its children via a Voronoi tessellation. Each leaf node corresponds to a training sample and stores the corresponding output. This general framework provides us with a method for systematically dealing with the complex relationship between the sensors and the manipulator. In the performance phase, given an input, the RPT is used to retrieve the desired output. The RPT results in a logarithmic average time complexity in the number of stored training samples.

Extensive simulations have been performed with two implemented modules. Experiments using a real setup demonstrate the ability of a system using RPTs to accomplish the stereo calibration, head-to-object space mapping, and point-to-point movement of the hand within the HEC task. Experiments using real data required that the current approach be simplified since collecting real data for training proved to be much more difficult and time consuming than generating simulated data. Nevertheless, promising results are obtained.

13/5/12 (Item 2 from file: 35)
DIALOG(R)File 35:Dissertation Abs Online
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1025981 ORDER NO: AAD88-20221

THE SOLUTION CONFIGURATION OF SEVERAL COMPLEX MICROBIAL POLYSACCHARIDES

Author: TALASHEK, TODD ANTHONY

Degree: PH.D.

Year: 1988

Corporate Source/Institution: UNIVERSITY OF CALIFORNIA, IRVINE (0030)

CHAIR: DAVID A. BRANT

Source: VOLUME 49/08-B OF DISSERTATION ABSTRACTS INTERNATIONAL.

PAGE 3229. 228 PAGES

Descriptors: CHEMISTRY, POLYMER

Descriptor Codes: 0495

The effect of short sidechains on the configuration-dependent properties of several microbial polysaccharides was investigated. An approach involving both theoretical modelling and experimental measurements was undertaken.

Theoretical modelling of these microbial polysaccharides required incorporation of the potential forces between residues which are second neighbors in the chain sequence in addition to the potential forces between the **nearest neighbor** residues. A mean field averaging method was developed which incorporated these second neighbor interactions, which depend on rotations at two linkages, into pseudo independent rotational potentials dependent on rotations about only a **single linkage**. This averaging becomes exact for sidechain residues when they interact significantly with only a single second neighbor main chain residue. Fortunately, this is the case for most polysaccharides.

One series of polysaccharides particularly suited to this study were the Kelco polysaccharides gellan, welan, and rhamsan. Each polysaccharide has the same backbone repeating unit, but welan and rhamsan have a short sidechain distinguishing them from gellan. By comparing the theoretically calculated configuration-dependent properties with the dilute solution properties of these polysaccharides, the effect of the sidechains can be assessed. Configuration-dependent properties calculated using theoretical modelling included characteristic ratios, persistence **vectors**, and correlation functions. Only small differences were found for these properties between the three polysaccharides, indicating van der Waals interactions of the sidechain have little effect on the configuration of the backbone. The characterization of the dilute solution properties of

gellan and welan included measures of the molecular weight and size by light scattering and viscosity experiments. Unfortunately, the tendency of gellan and welan to form aggregates prevented any conclusive molecular characterization. However, experimental measurements indicate that the differences in their physical properties are likely the result of intermolecular forces which were not included in the theoretical modelling.

Theoretical calculations were also performed on three Klebsiella polysaccharides, serotypes K2, K20, and K51. The effect of the sidechains on the configuration-dependent properties of these polysaccharides was much more pronounced. The differences were the result of strong sidechain-main chain interactions which served to change the positions in conformation **space** of the least energetic conformations of the K51 backbone **segments**.

13/5/13 (Item 1 from file: 2)
DIALOG(R) File 2:INSPEC
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6919293 INSPEC Abstract Number: C2001-06-6160M-014

Title: A new high-dimensional index structure using a cell-based filtering technique

Author(s): Sung-Geun Han; Jae-Woo Chang

Author Affiliation: Dept. of Comput. Eng., Chonbuk Nat. Univ., Chonju, South Korea

Conference Title: Current Issues in Databases and Information Systems. East-European Conference on Advances in Databases and Information Systems Held Jointly with International Conference on Database Systems for Advanced Applications, ADBIS-DASFAA 2000. Proceedings (Lecture Notes in Computer Science Vol.1884) p.79-92

Editor(s): Stuller, J.; Pokorny, J.; Thalheim, B.; Masunaga, Y.

Publisher: Springer-Verlag, Berlin, Germany

Publication Date: 2000 Country of Publication: Germany xiii+396 pp.

ISBN: 3 540 67977 4 Material Identity Number: XX-2000-02611

Conference Title: Current Issues in Databases and Information Systems

Conference Sponsor: INTAX; Hewlett Packard; KOMIX; Smart4U; DCIT

Conference Date: 5-9 Sept. 2000 Conference Location: Prague, Czech Republic

Language: English Document Type: Conference Paper (PA)

Treatment: Practical (P); Experimental (X)

Abstract: In general, multimedia database applications require to support similarity **search** for content-based retrieval on multimedia data, i.e., image, animation, video, and audio. Since the similarity of two multimedia objects is measured as the distance between their feature **vectors**, the similarity **search** corresponds to a **search** for the **nearest neighbors** in the feature **vector space**. We propose a new high-dimensional indexing scheme using a cell-based filtering technique which supports the **nearest neighbor search** efficiently. Our **cell**-based filtering (CBF) scheme **divides** a high-dimensional feature **vector space** into **cells**, like VA-file. However, in order to make a better effect on filtering, our CBF scheme performs additional filtering based on a distance between an object feature **vector** and the center of a cell including it, in addition to filtering based on cell signatures before accessing a data file. From our experiment using high-dimensional feature **vectors**, we show that our CBF scheme achieves better performance on the **nearest neighbor search** than its competitors, such as VA-File and X-tree. (12 Refs)

Subfile: C

Descriptors: content-based retrieval; database indexing; multimedia databases; software performance evaluation

Identifiers: high-dimensional index structure; cell-based filtering; multimedia database; similarity **search**; content-based retrieval; feature **vectors**; **nearest neighbor search**; database indexing; experiment; VA-File; X-tree

Class Codes: C6160M (Multimedia databases); C7250R (Information retrieval techniques); C6160S (Spatial and pictorial databases)

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DIALOG(R)File 2:INSPEC

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6492102 INSPEC Abstract Number: C2000-03-6170K-022

Title: Exploring MARS: an alternative to neural networks

Author(s): Dwinnell, W.

Journal: PC AI vol.14, no.1 p.21-4

Publisher: Knowledge Technology,

Publication Date: Jan.-Feb. 2000 Country of Publication: USA

CODEN: PCAIE5 ISSN: 0894-0711

SICI: 0894-0711(200001/02)14:1L:21:EMAN;1-I

Material Identity Number: F457-2000-001

U.S. Copyright Clearance Center Code: 0894-0711/2000/\$3.00+0.25

Language: English Document Type: Journal Paper (JP)

Treatment: Practical (P)

Abstract: Since their inception, neural networks commanded a significant amount of attention in the world of machine learning-yet neural networks are not the only option. While they have been instrumental in solving many difficult real-world problems, keep in mind the wide array of alternatives. One such alternative is multivariate adaptive regression splines (MARS), developed by statistician Jerome Friedman. MARS **segments** the **space** of possible input cases into rectangular regions that are fit with linear or cubic splines-splines being moderately complex curves. The MARS approach has proven effective at a variety of learning problems and is competitive with neural networks and non-parametric regressions, such as k- **nearest neighbors** . After its recent incorporation into the suite of products offered by Salford Systems, MARS has been further developed into a fine commercial tool. MARS is an excellent example of the powerful modeling tools developed by statisticians and is explored in the article. (0 Refs)

Subfile: C

Descriptors: learning (artificial intelligence); learning systems; splines (mathematics); statistical analysis

Identifiers: neural networks; machine learning; multivariate adaptive regression splines; MARS; input case space segmentation; rectangular regions; linear splines; cubic splines

Class Codes: C6170K (Knowledge engineering techniques); C4130 (Interpolation and function approximation (numerical analysis))

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13/5/15 (Item 3 from file: 2)

DIALOG(R)File 2:INSPEC

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5797404 INSPEC Abstract Number: A9804-6220F-009

Title: On plastic deformation and the dynamics of 3D dislocations

Author(s): Zbib, R.M.; Rhee, M.; Hirth, J.P.

Author Affiliation: Sch. of Mech. & Mater. Eng., Washington State Univ., Pullman, WA, USA

Journal: International Journal of Mechanical Sciences Conference Title: Int. J. Mech. Sci. (UK) vol.40, no.2-3 p.113-27

Publisher: Elsevier,

Publication Date: Feb.-March 1998 Country of Publication: UK

CODEN: IMSCAW ISSN: 0020-7403

SICI: 0020-7403(199802/03)40:2/3L:113:PDDD;1-T

Material Identity Number: I073-97011

U.S. Copyright Clearance Center Code: 0020-7403/98/\$19.00+0.00

Conference Title: 3rd Asia Pacific Symposium on Advanced in Engineering Plasticity and its Applications

Conference Date: Aug. 1996 Conference Location: Hiroshima, Japan

Document Number: S0020-7403(97)00043-X

Language: English Document Type: Conference Paper (PA); Journal Paper (JP)

Treatment: Theoretical (T)

Abstract: A three-dimensional (3D) mesoscopic model to simulate the collective dynamic behavior of a large number of curved dislocations of finite lengths has been developed for the purpose of analyzing deformation patterns and instabilities, including the formation of dislocation cell

structures. Each curved dislocation is approximated by a piecewise continuous array of straight line segments. The interactions among the segments, including line-tension and self-interactions, are treated explicitly. For longer-range interactions, the **space** is **divided** into a regular cellular array and the elastic **fields** of the dislocations in a remote cell approximated by a multipolar expansion, leading to an order N algorithm for the description of a cell containing N dislocations. For large arrays, the simulation volume is divided into cubical cells. A discrete random starting array is selected for the master cell and its **nearest neighbors**, which constitute an order 2 cell. Reflection boundary conditions are imposed for **near - neighbor** order 2 cells and so forth, creating an NaCl-type lattice array. The boundaries between the cells are considered to be relaxed grain boundaries. That is, recovery within the boundaries and rotation across them are considered to occur so that the boundaries have no associated elastic fields. This cell hierarchy, coupled with the multipole expansion, is suitable for the use of massively parallel computation, with individual cells assigned to separate processors. (29 Refs)

Subfile: A

Descriptors: dislocation structure; grain boundaries; plastic deformation ; slip

Identifiers: plastic deformation; 3D dislocations; collective dynamic behavior; finite lengths; deformation patterns; instabilities; dislocation cell structures; curved dislocation; straight line segments; longer-range interactions; regular cellular array; dislocations; multipolar expansion; discrete random starting array; master cell; order 2 cell; reflection boundary conditions; **near - neighbor** order 2 cells; NaCl-type lattice array; relaxed grain boundaries; elastic fields; cell hierarchy; multipole expansion

Class Codes: A6220F (Deformation and plasticity); A6170G (Dislocations: theory); A6170N (Grain and twin boundaries)

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13/5/16 (Item 4 from file: 2)

DIALOG(R)File 2:INSPEC

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5438337 INSPEC Abstract Number: A9702-8715B-005

Title: Constructing optimal backbone segments for joining fixed DNA base pairs

Author(s): Mazur, J.; Jernigan, R.L.; Sara, A.

Author Affiliation: SAIC, Fredrick Biomed. Super Comput. Lab., Fredrick, MD, USA

Journal: Biophysical Journal vol.71, no.3 p.1493-506

Publisher: Biophys. Soc,

Publication Date: Sept. 1996 Country of Publication: USA

CODEN: BIOJAU ISSN: 0006-3495

SICI: 0006-3495(199609)71:3L:1493:COBS;1-M

Material Identity Number: B154-96010

U.S. Copyright Clearance Center Code: 0006-3495/96/09/1493/14/\$2.00

Language: English Document Type: Journal Paper (JP)

Treatment: Experimental (X)

Abstract: A method is presented to link a sequence of **space** -fixed base pairs by the sugar-phosphate **segments** of single nucleotides and to evaluate the effects in the backbone caused by this positioning of the bases. The entire computational unit comprises several nucleotides that are energy-minimized, subject to constraints imposed by the sugar-phosphate backbone **segments** being anchored to **space** -fixed base pairs. The minimization schemes are based on two stages, a conjugate gradient method followed by a Newton-Raphson algorithm. Because our purpose is to examine the response, or relaxation, of an artificially stressed backbone, it is essential to be able to obtain, as closely as possible, a lowest minimum energy conformation of the backbone **segment** in conformational **space**. For this purpose, an algorithm is developed that leads to the generation of an assembly of many local energy minima. From these sets of local minima, one conformation corresponding to the one with the lowest minimum is then selected and designated to represent the backbone segment at its minimum.

The effective electrostatic potential of mean force is expressed in terms of adjustable parameters that incorporate solvent screening action in the Coulombic interactions between charged backbone atoms; these parameters are adjusted to obtain the best fit of the **nearest - neighbor** phosphorous atoms in an X-ray structure. (41 Refs)

Subfile: A

Descriptors: DNA; molecular biophysics

Identifiers: minimization schemes; fixed DNA base pairs; space-fixed base pairs; conjugate gradient method; single nucleotides; entire computational unit; sugar-phosphate backbone segments; Newton-Raphson algorithm; relaxation; artificially stressed backbone; lowest minimum energy conformation; conformational space; local energy minima; effective electrostatic potential; solvent screening action; Coulombic interactions; charged backbone atoms; **nearest - neighbor** P atoms; X-ray structure; joining

Class Codes: A8715B (Biomolecular structure, configuration, conformation, and active sites)

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13/5/17 (Item 5 from file: 2)

DIALOG(R)File 2:INSPEC

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5335723 INSPEC Abstract Number: B9609-6140C-506, C9609-1250-194

Title: Learning-based object segmentation for fovea images

Author(s): Yuntao Cui; Weng, J.

Author Affiliation: Dept. of Comput. Sci., Michigan State Univ., East Lansing, MI, USA

Conference Title: ACCV '95. Second Asian Conference on Computer Vision. Proceedings Part vol.2 p.71-5 vol.2

Publisher: Nanyang Technol. Univ, Singapore

Publication Date: 1995 Country of Publication: Singapore 3 vol. (xxxii+548+811+839) pp.

ISBN: 981 00 7177 9 Material Identity Number: XX96-01801

Conference Title: Proceedings of Second Asian Conference on Computer Vision. ACCV '95

Conference Sponsor: Int. Assoc. Pattern Recognition; IEICE of Japan; Inf. Processing Soc. Japan; et al

Conference Date: 5-8 Dec. 1995 Conference Location: Singapore

Language: English Document Type: Conference Paper (PA)

Treatment: Practical (P); Theoretical (T)

Abstract: In this paper, we consider the problem of segmenting 2D objects from intensity fovea images based on learning. During the training, we apply the Karhunen-Loeve projection to the training set to obtain a set of eigen- **vectors** and also construct a space decomposition tree to achieve logarithmic retrieval time complexity. The eigen- **vectors** are used to reconstruct the test fovea image. Then we apply a spring network model to the reconstructed image to generate a polygon mask. After applying the mask to the test image, we **search** the **space** decomposition tree to find the **nearest neighbor** to **segment** the object from background. (13 Refs)

Subfile: B C

Descriptors: computational complexity; eigenvalues and eigenfunctions; image segmentation; object detection

Identifiers: learning-based object segmentation; fovea images; 2D objects segmentation; Karhunen-Loeve projection; training set; eigenvectors; space decomposition tree; logarithmic retrieval time complexity; spring network model; polygon mask

Class Codes: B6140C (Optical information, image and video signal processing); B0290H (Linear algebra); C1250 (Pattern recognition); C5260B (Computer vision and image processing techniques); C4140 (Linear algebra); C4240C (Computational complexity)

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13/5/18 (Item 6 from file: 2)

DIALOG(R)File 2:INSPEC

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5162301 INSPEC Abstract Number: B9602-6140C-369, C9602-1250-188

Title: 2D object segmentation from fovea images based on eigen-subspace learning

Author(s): Yuntao Cui; Weng, J.

Author Affiliation: Dept. of Comput. Sci., Michigan State Univ., East Lansing, MI, USA

Conference Title: Proceedings International Symposium on Computer Vision (Cat. No.95TB100006) p.305-10

Publisher: IEEE Comput. Soc. Press, Los Alamitos, CA, USA

Publication Date: 1995 Country of Publication: USA xiv+624 pp.

ISBN: 0 8186 7190 4 Material Identity Number: XX95-02843

U.S. Copyright Clearance Center Code: 0 8186 7190 4/95/\$4.00

Conference Title: Proceedings of International Symposium on Computer Vision - ISCV

Conference Sponsor: IEEE Comput. Soc. Tech. Committee for Pattern Anal. & Machine Intelligence (PAMI)

Conference Date: 21-23 Nov. 1995 Conference Location: Coral Gables, FL, USA

Language: English Document Type: Conference Paper (PA)

Treatment: Applications (A); Practical (P)

Abstract: In this paper, we consider the problem of segmenting 2D objects from intensity fovea images based on learning. During the training, we apply the Karhunen-Loeve projection to the training set to obtain a set of eigenvectors and also construct a space decomposition tree to achieve logarithmic retrieval time complexity. The eigenvectors are used to reconstruct the test fovea image. Then we apply a spring network model to the reconstructed image to generate a polygon mask. After applying the mask to the test image, we **search** the **space** decomposition tree to find the **nearest neighbor** to **segment** the object from background. The system is tested to segment 25 classes of different hand shapes. The experimental results show 97% correct rate for the hands presented in the training (because of the background effect) and 93% correct rate for the hands that have not been used in the training phase. (20 Refs)

Subfile: B C

Descriptors: computational complexity; eigenvalues and eigenfunctions; image segmentation; learning (artificial intelligence)

Identifiers: 2D object segmentation; fovea images; eigen-subspace learning; Karhunen-Loeve projection; eigenvectors; space decomposition tree; logarithmic retrieval time complexity; spring network model; polygon mask

Class Codes: B6140C (Optical information, image and video signal processing); B0290H (Linear algebra); C1250 (Pattern recognition); C4240C (Computational complexity); C4140 (Linear algebra); C5260B (Computer vision and image processing techniques); C1240 (Adaptive system theory); C1230 (Artificial intelligence)

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13/5/19 (Item 7 from file: 2)

DIALOG(R)File 2:INSPEC

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5071499 INSPEC Abstract Number: A9521-0540-011

Title: Parallel cluster labeling for large-scale Monte Carlo simulations

Author(s): Flanigan, M.; Tamayo, P.

Author Affiliation: Thinking Machines Corp., Cambridge, MA, USA

Journal: Physica A vol.215, no.4 p.461-80

Publication Date: 15 May 1995 Country of Publication: Netherlands

CODEN: PHYADX ISSN: 0378-4371

U.S. Copyright Clearance Center Code: 0378-4371/95/\$09.50

Language: English Document Type: Journal Paper (JP)

Treatment: Theoretical (T)

Abstract: We present an optimized version of a cluster labeling algorithm previously introduced by the authors. This algorithm is well suited for large-scale Monte Carlo simulations of spin models using cluster dynamics on parallel computers with large numbers of processors. The algorithm **divides** physical **space** into rectangular **cells** which are assigned to processors and combines a serial local labeling procedure with a relaxation

process across **nearest - neighbor** processors. By controlling overhead and reducing inter-processor communication this method attains good computational speed-up and efficiency. Large systems of up to 65536/sup 2/ spins have been simulated at updating speeds of 11 nanosecs/site (90.7*10/sup 6/ spin updates/sec) using state-of-the-art supercomputers. In the second part of the article we use the cluster algorithm to study the relaxation of magnetization and energy on large Ising models using Swendsen-Wang dynamics. We found evidence that exponential and power law factors are present in the relaxation process as has been proposed by Hackl et al (1993). The variation of the power-law exponent $\lambda / \text{sub } M /$ taken at face value indicates that the value of $z / \text{sub } M /$ falls in the interval 0.31-0.49 for the time interval analysed and appears to vanish asymptotically. (49 Refs)

Subfile: A

Descriptors: Ising model; Monte Carlo methods

Identifiers: parallel cluster labelling; large-scale Monte Carlo simulations; spin models; cluster dynamics; parallel computers; physical space; rectangular cells; relaxation; **nearest - neighbor** processors; inter-processor communication; supercomputers; magnetization; Ising models; Swendsen-Wang dynamics; time interval

Class Codes: A0540 (Fluctuation phenomena, random processes, and Brownian motion); A0250 (Probability theory, stochastic processes, and statistics); A0550 (Lattice theory and statistics; Ising problems)

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13/5/20 (Item 8 from file: 2)

DIALOG(R)File 2:INSPEC

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5031262 INSPEC Abstract Number: A9518-7125C-003

Title: **Generating tight-binding Hamiltonians with finite-difference methods**

Author(s): Thijssen, J.M.; Inglesfield, J.E.

Author Affiliation: Nijmegen Univ., Netherlands

Journal: Physical Review B (Condensed Matter) vol.51, no.24 p. 17988-91

Publication Date: 15 June 1995 Country of Publication: USA

CODEN: PRBMDO ISSN: 0163-1829

U.S. Copyright Clearance Center Code: 0163-1829/95/51(24)/17988(4)/\$6.00

Language: English Document Type: Journal Paper (JP)

Treatment: Theoretical (T)

Abstract: A method is presented for deriving a **nearest - neighbor** tight-binding Hamiltonian for electrons in solids, starting from a finite-difference Hamiltonian with atomic spheres embedded in it. The **space** is **divided** into **cells** surrounding the atoms. The basis states of the tight-binding Hamiltonian are the eigenstates of the finite-difference Hamiltonian in these cells with zero derivative boundary conditions at the cell boundaries. To calculate the matrix elements of the full Hamiltonian, the couplings over the links crossing the cell boundaries need to be restored which leads to a coupling between states in neighboring cells. The resulting tight-binding Hamiltonian is energy independent. Typically about 100 states per cell are needed to achieve reasonable accuracy. (13 Refs)

Subfile: A

Descriptors: eigenvalues and eigenfunctions; finite difference methods; matrix algebra; tight-binding calculations

Identifiers: **nearest - neighbor** tight-binding Hamiltonian; finite-difference methods; solids; atomic spheres; basis states; eigenstates; zero derivative boundary conditions; cell boundaries; matrix elements

Class Codes: A7125C (Techniques of band-structure calculation (general theory, applications of group theory, analytic continuation, etc.)); A7110 (General theories and computational techniques for electron states in condensed matter); A0210 (Algebra, set theory, and graph theory); A0260 (Numerical approximation and analysis)

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13/5/21 (Item 9 from file: 2)

DIALOG(R)File 2:INSPEC

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4652704 INSPEC Abstract Number: C9406-4260-009

Title: On collision-free placements of simplices and the closest pair of lines in 3-space

Author(s): Pellegrini, M.

Author Affiliation: Dept. of Comput. Sci., King's Coll., London, UK

Journal: SIAM Journal on Computing vol.23, no.1 p.133-53

Publication Date: Feb. 1994 Country of Publication: USA

CODEN: SMJCAT ISSN: 0097-5397

U.S. Copyright Clearance Center Code: 0097-5397/94/\$1.50+0.10

Language: English Document Type: Journal Paper (JP)

Treatment: Theoretical (T)

Abstract: The problem of detecting efficiently whether a **query** simplex is collision-free among polyhedral obstacles is considered. If n is the number of vertices, edges, and faces of the polyhedral obstacles, and m is the amount of storage allocated for the data structure ($n/\sup 1 + \epsilon$ / $\leq m \leq n/\sup 4 + \epsilon$ /), it is possible to solve collision-free placements **queries** for simplices in time $O(n/\sup 1 + \epsilon / m/\sup 1/4)$ for any $\epsilon > 0$, where the constants depend on ϵ . In order to solve this problem the authors develop data structures to detect on-line intersections of **query** half planes with sets of lines and **segments**. Some **nearest - neighbor** problems for objects in 3- **space** are also considered. Given a set of n lines in 3- **space**, the shortest vertical **segment** between any pair of lines is found in randomized expected time $O(n/\sup 8/5 + \epsilon /)$ for every $\epsilon > 0$. The longest connecting vertical segment is found in time $O(n/\sup 4/3 + \epsilon /)$. The shortest connecting segment is found in time $O(n/\sup 5/3 + \epsilon /)$. (56 Refs)

Subfile: C

Descriptors: computational geometry; tree data structures

Identifiers: collision-free placements; simplices; closest pair of lines; 3-space; **query** simplex; polyhedral obstacles; data structure

Class Codes: C4260 (Computational geometry); C6120 (File organisation); C1160 (Combinatorial mathematics)

13/5/22 (Item 10 from file: 2)

DIALOG(R)File 2:INSPEC

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4487130 INSPEC Abstract Number: C9311-4260-013

Title: Ray shooting and parametric search

Author(s): Agarwal, P.K.; Matousek, J.

Author Affiliation: Dept. of Comput. Sci., Duke Univ., Durham, NC, USA

Journal: SIAM Journal on Computing vol.22, no.4 p.794-806

Publication Date: Aug. 1993 Country of Publication: USA

CODEN: SMJCAT ISSN: 0097-5397

SICI: 0097-5397(199308)22:4L:794:SPS;1-E

Material Identity Number: S171-93005

U.S. Copyright Clearance Center Code: 0097-5397/93/\$1.50+0.10

Language: English Document Type: Journal Paper (JP)

Treatment: Theoretical (T)

Abstract: Efficient algorithms for the ray shooting problem are presented. Given a collection Γ of objects in $R/\sup d$, build a data structure so that, for a **query** ray, the first object of Γ hit by the ray can be quickly determined. Using the parametric **search** technique, this problem is reduced to the **segment** emptiness problem. For various ray shooting problems, **space / query** -time trade-offs of the following type are achieved: For some integer b and a parameter m ($n/\sup b \leq m \leq n/\sup 1 + \epsilon$ /) the **queries** are answered in time $O((n/m/\sup 1/b) \log/\sup O(1)/n)$, with $O(m/\sup 1 + \epsilon /)$ space and preprocessing time ($\epsilon > 0$ is arbitrarily small but fixed constant). $b = \lfloor d/2 \rfloor$ is obtained for ray shooting in a convex d -polytope defined as an intersection of n half **spaces**, $b = d$ for an arrangement of n hyperplanes in $R/\sup d$, and $b = 3$ for an arrangement of n half planes in $R/\sup 3$. This approach also yields fast procedures for

finding the first k objects hit by a **query** ray, for **searching** nearest and farthest neighbors, and for hidden surface removal. All the data structures can be maintained dynamically in amortized time $O(m/\sup 1+\epsilon/n)$ per insert/delete operation. (29 Refs)

Subfile: C

Descriptors: computational geometry; hidden feature removal; **search** problems; spatial data structures

Identifiers: ray shooting; parametric **search** ; efficient algorithms; data structure; **query** ray; segment emptiness problem; space/ **query** -time trade-offs; space complexity; preprocessing time; **nearest neighbors** ; farthest neighbors; hidden surface removal; amortized time

Class Codes: C4260 (Computational geometry); C4240 (Programming and algorithm theory); C6120 (File organisation)

13/5/23 (Item 11 from file: 2)

DIALOG(R)File 2:INSPEC

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04393919 INSPEC Abstract Number: A9311-0550-021, C9306-7320-038

Title: A parallel cluster labeling method for Monte Carlo dynamics

Author(s): Flanigan, M.; Tamayo, P.

Author Affiliation: Thinking Machines Corp., Cambridge, MA, USA

Journal: International Journal of Modern Physics C (Physics and Computers) vol.3, no.6 p.1235-49

Publication Date: Dec. 1992 Country of Publication: Singapore

CODEN: IJMPEO ISSN: 0129-1831

Language: English Document Type: Journal Paper (JP)

Treatment: Practical (P)

Abstract: Presents an algorithm for cluster dynamics of efficiently simulate large systems on MIMD parallel computers with large numbers of processing nodes. The method **divides** physical **space** into rectangular **cells** which are assigned to processing nodes and combines a serial procedure, by which clusters are labeled locally inside each cell, with a **nearest neighbor** relaxation process in which processing nodes exchange labels until a fixed point is reached. By controlling overhead and reducing inter-processor communication this method attains good performance and speed-up. The complexity and scaling properties of the algorithm are analyzed. The algorithm has been used to simulate large two-dimensional Ising systems (up to 27808*27808 sites) with Swendsen-Wang (1987) dynamics. Typical updating times on the order of 82 nanosecs/site and efficiencies larger than 90% have been obtained using 256 processing nodes on the CM-5 supercomputer. (33 Refs)

Subfile: A C

Descriptors: computational complexity; digital simulation; Ising model; large-scale systems; Monte Carlo methods; parallel algorithms; percolation; physics computing; relaxation; statistical mechanics

Identifiers: label exchange; simulation; percolation; Swendsen-Wang dynamics; accelerated dynamics; cluster labeling; Monte Carlo dynamics; cluster dynamics; MIMD parallel computers; rectangular cells; processing nodes; serial procedure; **nearest neighbor** relaxation process; overhead; inter-processor communication; performance; speed-up; complexity; scaling properties; large two-dimensional Ising systems; updating times; CM-5 supercomputer

Class Codes: A0550 (Lattice theory and statistics; Ising problems); A0520G (Classical ensemble theory); C7320 (Physics and Chemistry); C1140G (Monte Carlo methods); C4240P (Parallel programming and algorithm theory); C6110P (Parallel programming)

13/5/24 (Item 12 from file: 2)

DIALOG(R)File 2:INSPEC

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04028545 INSPEC Abstract Number: C9201-1240-002

Title: Generalization effects of k-neighbor interpolation training

Author(s): Kawabata, T.

Author Affiliation: NTT Basic Res. Labs., Tokyo, Japan

Journal: Neural Computation vol.3, no.3 p.409-17
Publication Date: Fall 1991 Country of Publication: USA
CODEN: NEUCEB ISSN: 0899-7667
Language: English Document Type: Journal Paper (JP)
Treatment: Theoretical (T)

Abstract: A new training method is given for a continuous mapping and/or pattern classification neural network that performs local sample-density smoothing. A conventional training method uses point-to-point mapping from an input space to an output space. Even though the mapping may be precise at two given training sample points, there are no guarantees of mapping accuracy at points on a line segment connecting the sample points. The author discusses a theory for formulating line-to-line mapping. The theory is called interpolation training. The theory is expanded to k- **nearest neighbor** interpolation. The k-neighbor interpolation training (KNIT) method connects an input sample training point to its k-neighbor points via k line **segments**. Then, the method maps these k line **segments** in the input **space** for each training sample to linear line **segments** in the output **space** that interpolate between training output values. Thus, a web structure made by connecting input samples is mapped into the same structure in an output space. The KNIT method reduces the overlearning problem caused by point-to-point training by smoothing input/output functions. Simulation tasks show that KNIT improves vowel recognition on a small speech database. (7 Refs)

Subfile: C

Descriptors: interpolation; learning systems; neural nets; pattern recognition

Identifiers: continuous mapping; pattern classification neural network; local sample-density smoothing; mapping accuracy; line segment; line-to-line mapping; k- **nearest neighbor** interpolation; interpolation training; input sample training point; web structure; KNIT method; overlearning problem; input/output functions; vowel recognition; small speech database

Class Codes: C1240 (Adaptive system theory); C1250 (Pattern recognition); C4130 (Interpolation and function approximation)

13/5/25 (Item 13 from file: 2)

DIALOG(R)File 2:INSPEC

(c) 2002 Institution of Electrical Engineers. All rts. reserv.

02799146 INSPEC Abstract Number: A87015123

Title: On the realization of continuous flavor symmetries in large N lattice QCD with Susskind fermions

Author(s): Banks, T.

Author Affiliation: Linear Accelerator Center, Stanford Univ., CA, USA

Journal: Nuclear Physics B, Particle Physics vol.B278, no.1 p.141-6

Publication Date: 1 Dec. 1986 Country of Publication: Netherlands

CODEN: NUPBBO ISSN: 0550-3213

U.S. Copyright Clearance Center Code: 0550-3213/86/\$03.50

Language: English Document Type: Journal Paper (JP)

Treatment: Theoretical (T)

Abstract: There have been many discussions of chiral symmetry breaking in strongly-coupled lattice gauge theories. Some of these studies work with a **nearest - neighbor** fermion Hamiltonian using either the naive discretization of the Dirac equation of Susskind's staggered fermions. Many authors claim to find spontaneous breakdown of continuous symmetries in these models. However the models in question are equivalent to N/sub F/ flavors of staggered fermions and the symmetries in question are simply the isospin-like transformations between the different flavors. One can however choose a basis for the continuum fermion fields such that these symmetry generators carry gamma /sub 5/'s. Addressing this problem the author proves that (i) at N= infinity , QCD has several inequivalent degenerate vacua, some of which break the flavor symmetry, but one of which does not. These vacua are **separated** from each other in **field space** -they are isolated minima of the potential. (ii) The degeneracy of the N= infinity vacuum is accidental; a consequence of the fact that at N= infinity different flavors contribute additively to the vacuum energy. At next order in 1/N the degeneracy is split and the symmetric vacuum is preferred. (6 Refs)

Subfile: A

Descriptors: axiomatic field theory; colour model; elementary particle symmetry

Identifiers: lattice QCD; continuous flavor symmetries; large N lattice QCD; Susskind fermions; chiral symmetry breaking; strongly-coupled lattice gauge theories

Class Codes: A1110C (Axiomatic approach); A1130 (Symmetry and conservation laws); A1235E (Applications of quantum chromodynamics to particle properties and reactions)

13/5/26 (Item 14 from file: 2)

DIALOG(R)File 2:INSPEC

(c) 2002 Institution of Electrical Engineers. All rts. reserv.

00862171 INSPEC Abstract Number: A76013787

Title: Phase diagrams of liquid helium mixtures and metamagnets: experiment and mean field theory

Author(s): Kincaid, J.M.; Cohen, E.G.D.

Author Affiliation: Dept. of Mech., State Univ. of New York, Stony Brook, NY, USA

Journal: Physics Reports. Physics Letters Section C vol.22c, no.2 p.57-143

Publication Date: Nov. 1975 Country of Publication: Netherlands

CODEN: PRPLCM

Language: English Document Type: Journal Paper (JP)

Treatment: Bibliography (B); Theoretical (T)

Abstract: The phase behavior at low temperature of liquid ^3He - ^4He mixtures and certain types of metamagnets is investigated. Special attention is given to the similarity in the behavior of the two systems. The phase behavior of each system is calculated on the basis of a simple model treated in mean field approximation. For the helium mixtures an isotopic mixture of hard-spheres following Fermi and Bose statistics is used, while for the metamagnet a two sublattice spin $1/2$ Ising model with **nearest neighbor** and **next-nearest neighbor** interactions is employed. The Hamiltonians of the two models are extended to include symmetry breaking fields: a particle source field for the helium mixtures and a staggered magnetic field for the metamagnet. The phase diagrams and critical behavior of the two models in an extended thermodynamic **space** that includes the **symmetry breaking fields** are discussed. Although the two models are very similar, there are differences near $T=0\text{K}$ and in some of the critical exponents. (121 Refs)

Subfile: A

Descriptors: crystal field theory; Ising model; liquid helium 3-4 mixtures; magnetic transitions of substances; metamagnetism; phase diagrams

Identifiers: metamagnets; mean field theory; Bose statistics; Hamiltonians; symmetry breaking fields; particle source field; staggered magnetic field; extended thermodynamic space; critical exponents; two sublattice spin $1/2$ Ising model; low temperature phase behaviour; critical properties; FeCl_2 ; tricritical properties; liquid ^3He - ^4He mixtures; phase transitions; anisotropic antiferromagnets; first order transition; Fermi statistics; Lambda type transition; isotopic hard sphere mixture; nearest neighbour interactions; Bose Fermi mixture; particle source field

Class Codes: A6760 (Mixed systems; liquid helium 3-4 mixtures); A7510D (Crystal-field theory and spin Hamiltonians); A7510H (Ising and other classical spin models); A7540 (Critical-point effects, specific heats, short-range order)

13/5/27 (Item 1 from file: 6)

DIALOG(R)File 6:NTIS

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1505144 NTIS Accession Number: AD-A219 339/9

Automated Design of Multiple-Class Piecewise Linear Classifiers

Park, Y. ; Sklansky, J.

California Univ., Irvine. Dept. of Electrical Engineering.

Corp. Source Codes: 005414019; 409991

Sponsor: Army Research Office, Research Triangle Park, NC.

Report No.: ARO-26194.1-MA

1989 29p

Languages: English Document Type: Journal article

Journal Announcement: GRAI9014

Pub. in Jnl. of Classification, v6 p195-222 1989.

Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.

NTIS Prices: PC A03/MF A01

Country of Publication: United States

Contract No.: DAAL03-88-K-0117

A new method and a supporting theorem for designing multiple-class piecewise linear classifiers are described. The method involves the cutting of straight line segments joining pairs of opposed points (i.e., points from distinct classes) in **d-dimensional space**. We refer to such straight line **segments** as links. We show how nearly to minimize the number of hyperplanes required to cut all of these links, thereby yielding a near-Bayes-optimal decision surface regardless of the number of classes and we describe the underlying theory. This method does not require parameters to be specified by users -- an improvement over earlier methods.

Keywords: Classifiers; **Nearest neighbor** rule; Prototype; Cluster; Window training; Bayes decisions; Training-set consistency. Reprints. (edc)

Descriptors: *Classification; Automation; Computer aided design; Bayes theorem; Consistency; Decision theory; Joining; Linear systems; Optimization; Reprints; Theorems; Training; Windows

Identifiers: **Nearest neighbor** rule; Linear classifiers; NTISDODXR; NTISDODA

Section Headings: 72E (Mathematical Sciences--Operations Research); 72B (Mathematical Sciences--Algebra, Analysis, Geometry, and Mathematical Logic)

13/5/28 (Item 1 from file: 144)

DIALOG(R) File 144:Pascal

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14847812 PASCAL No.: 00-0532388

A new high-dimensional index structure using a cell-based filtering technique

Current issues in databases and information systems : Prague, 5-9 September 2000

HAN S G; CHANG J W

STULLER Julius, ed; POKORNY Jatoslav, ed; THALHEIM Bernhard, ed; MASUNAGA Yoshifumi, ed

Dept. of Computer Engineering, Chonbuk National University, Chonju, Chonbuk 560-756, Korea, Republic of

East-European conference on advances in databases and information system
International conference on database systems for advanced applications (Prague CZE) 2000-09-05

Journal: Lecture notes in computer science, 2000, 1884 79-92

ISBN: 3-540-67977-4 ISSN: 0302-9743 Availability: INIST-16343; 354000090086660070

No. of Refs.: 12 ref.

Document Type: P (Serial); C (Conference Proceedings) ; A (Analytic)

Country of Publication: Germany; United States

Language: English

In general, multimedia database applications require to support similarity **search** for content-based retrieval on multimedia data, i.e., image, animation, video, and audio. Since the similarity of two multimedia objects is measured as the distance between their feature **vectors**, the similarity **search** corresponds to a **search** for the **nearest neighbors** in the feature **vector space**. In this paper, we propose a new high-dimensional indexing scheme using a cell-based filtering technique which supports the **nearest neighbor search** efficiently. Our **Cell-Based Filtering (CBF)** scheme **divides** a high- **dimensional** feature

vector **space** into **cells**, like VA-file. However, in order to make a better effect on filtering, our CBF scheme performs additional filtering based on a distance between an object feature **vector** and the center of a cell including it, in addition to filtering based on cell signatures before accessing a data file. From our experiment using high-dimensional feature **vectors**, we show that our CBF scheme achieves better performance on the **nearest neighbor search** than its competitors, such as VA-File and X-tree.

English Descriptors: **Nearest neighbor** approximation; **Search** algorithm
; Algorithm performance; Information system; Multimedia systems; Indexing

French Descriptors: Approximation plus proche voisin; Algorithmme recherche;
Performance algorithmme; Systeme information; Systeme multimedia;
Indexation

Classification Codes: 001D02B07D

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13/5/29 (Item 1 from file: 34)

DIALOG(R) File 34:SciSearch(R) Cited Ref Sci
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03426500 Genuine Article#: PE259 Number of References: 68

Title: DUAL-ECHO MRI SEGMENTATION USING VECTOR DECOMPOSITION AND
PROBABILITY TECHNIQUES - A 2-TISSUE MODEL

Author(s): KAO YH; SORENSON JA; BAHN MM; WINKLER SS

Corporate Source: DUKE UNIV, MED CTR, DEPT RADIOLOG, ROOM 129, BRYAN RES BLDG, BOX
3302/DURHAM//NC/27710; UNIV WISCONSIN, DEPT PHYS/MADISON//WI/53706; UNIV
WISCONSIN, DEPT MED PHYS/MADISON//WI/53706; UNIV WISCONSIN, DEPT
RADIOLOG/MADISON//WI/53706; WILLIAM S MIDDLETON MEM VET ADM MED CTR, SERV
RADIOLOG/MADISON//WI/00000

Journal: MAGNETIC RESONANCE IN MEDICINE, 1994, V32, N3 (SEP), P342-357

ISSN: 0740-3194

Language: ENGLISH Document Type: ARTICLE

Geographic Location: USA

Subfile: SciSearch; CC CLIN--Current Contents, Clinical Medicine

Journal Subject Category: RADIOLOGY & NUCLEAR MEDICINE

Abstract: We combined a **vector** decomposition technique with Gaussian probability thresholding in feature **space** to **segment** normal brain tissues, tumors, or other abnormalities on dual-echo MR images. The **vector** decomposition technique assigns to each voxel a fractional volume for each of two tissues. A probability threshold, based on an assumed Gaussian probability density function describing random noise, isolates a region in feature space for fractional volume calculation that minimizes contamination from other tissues. The calculated fractional volumes are unbiased estimates of the true fractional volumes. The contrast-to-noise ratio (CNR) between tissues on the segmented images is the same as the Euclidean norm of CNRs in the original images. The method is capable of segmenting more than two tissues from a set of dual-echo images by sequentially analyzing different pairs of tissues. The model is analyzed mathematically and in experiments with a phantom. Two clinical examples are presented.

Descriptors--Author Keywords: SEGMENTATION ; VOLUME MEASUREMENT ;
FRACTIONAL VOLUME ; IMAGE PROCESSING

Identifiers--KeyWords Plus: MAGNETIC-RESONANCE IMAGES; CEREBROSPINAL-FLUID
SPACES; TEMPORAL-LOBE; GRAY-MATTER; MULTISPECTRAL ANALYSIS; FIELD
INHOMOGENEITIES; HIPPOCAMPAL-FORMATION; VOLUME MEASUREMENTS; BRAIN;
NOISE

Research Fronts: 92-2388 001 (POSITRON EMISSION TOMOGRAPHY; 3-DIMENSIONAL
FUNCTIONAL BRAIN IMAGES; REGIONAL CEREBRAL BLOOD-FLOW)

92-6243 001 (EXPLORATORY DATA-ANALYSIS; PREDICTION OF GRASSLAND
HABITATS; FAST **NEAREST NEIGHBOR** CLASSIFICATION METHODS FOR
MULTISPECTRAL IMAGERY)

92-6417 001 (MR IMAGING; FAST SPIN-ECHO PULSE SEQUENCES; INTRACEREBRAL

LESION CONTRAST)

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13/5/30 (Item 1 from file: 95)
DIALOG(R)File 95:TEME-Technology & Management
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00647352 E93014287031

New algorithmic results for lines-line-3-space problems

(Neue Algorithmen fuer das Linien-Problem im dreidimensionalen Raum)

Guibas, LJ; Pellegrini, M

Internatioal Computer Science Inst., Berkeley, USA

1992

Document type: Report Language: English

Record type: Abstract

ABSTRACT:

In the first part we consider some incidence and ordering problems for lines in 3-space. We solve the problem of detection efficiently if a **query** simplex is collision-free among polyheral obstacles. In roder to solve this prolem we develop new on-line data structures to detect intersections of **query** halfplanes with sets of lines and segments. Then, we consider the **nearest - neighbor** problems for lines. Given a set of n lines in 3-space, the shortest vertical **segment** between any pair of lines is found in randomized expected time $O(n(\exp 8/5 + \epsilon))$ for every $\epsilon > 0$. The longest connecting vertical segment is found in time $O(n(\exp 4/3 + \epsilon))$. The shortest connecting segment is found in time $O(n(\exp 5/3 + \epsilon))$. Problems involving lines, points and spheres in 3-space have important applications in graphics, CAD and optimization. In the second part of the report we consider several problems of this kind. We give subquadratic algorithms to count the number of incidences between a set of lines and a set of spheres, and to find the minimum distance between a set of lines and a set of points. We show that the sphere of minimum radius intersecting every line in a set of n lines can be found in optimal expected time $O(n)$. Given m possibly intersecting spheres we solve ray-shooting **queries** in $O(\log(\exp 2)m)$ time using a dat structure of size $O(m(\exp 5 + \epsilon))$.

DESCRIPTORS: GRAPHIC DATA PROCESSING; ALGORITHM; LINES; 3D IMAGING;
IMPROVEMENT; IMAGE PROCESSING; COMPUTER AIDED DESIGN
IDENTIFIERS: GEOMETRIE; graphische Datenverarbeitung

11/3,K/1 (Item 1 from file: 47)

DIALOG(R)File 47:Gale Group Magazine DB(TM)

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05193495 SUPPLIER NUMBER: 20852159 (USE FORMAT 7 OR 9 FOR FULL TEXT)

High-power directional emission from microlasers with chaotic resonators.

Gmachl, Claire; Narimanov, E. E.

Science, v280, n5369, p1556(9)

June 5, 1998

ISSN: 0036-8075

LANGUAGE: English

RECORD TYPE: Fulltext; Abstract

WORD COUNT: 8874

LINE COUNT: 00703

... a two-dimensional (21)) resonator with a quadrupolar deformation of the circular boundary, described in **polar coordinates** (r, (Phi)) by r ((Phi)) (varies), (1 + (Epsilon) (multiplied by) cos (2 (Phi))), where (Epsilon...is broadened by diffraction and was measured integrated over the vertical extension. We introduce a **polar coordinate** system (r, ((Phi)) such that (Phi) = 0 (degree) indicates the direction along the elongated (major...were predicted first by a completely different theoretical approach, before they were found by numerical **search** . This different approach, which has been pioneered in physics (28-30) and physical chemistry (31...C. Gmachl et al., IEEE J. Quantum Electron. 33, 1567 (1997).

(18.) The electric field **vector** is oriented vertical to the laser plane; therefore, light coupling is prohibited in this direction...E. Narimanov and A. D. Stone are in the Department of Applied Physics, Yale University, **Post Office** Box 208284, New Haven, CT 06520, USA. J. U. Nockel is at the Max-Planck...

11/3,K/2 (Item 2 from file: 47)

DIALOG(R)File 47:Gale Group Magazine DB(TM)

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04414247 SUPPLIER NUMBER: 17817451 (USE FORMAT 7 OR 9 FOR FULL TEXT)

New year in space science: explorations for '96. (planned space missions listed by month)

Cowen, Ron

Science News, v149, n2, p24(3)

Jan 13, 1996

ISSN: 0036-8423

LANGUAGE: English

RECORD TYPE: Fulltext; Abstract

WORD COUNT: 2405

LINE COUNT: 00193

... Edward J. Weiler, that's because the agency is developing new space-based strategies to **search** for planets orbiting nearby stars.

These plans face the harsh reality of massive budget cuts...

...launch in July to examine finer-scale structure in the aurora. Researchers also plan to **coordinate Polar** observations with those taken by the recently launched Wind craft, which tracks the wind of...

...and Perseus. SWAS will also examine gas-rich regions beyond the Milky Way, including our **nearest neighbors** , the Large and Small Magellanic Cloud galaxies.

May

* A prototype of an inflatable radio antenna...gas in the Milky Way and from celestial sources far beyond. Yet another detector will **search** for the mysterious flashes of energy known as gamma-ray bursts. Like illumination from a...

...the Compton Gamma Ray Observatory, the main satellite now studying these flashes. On Earth, astronomers **searching** for visible-light counterparts of these ephemeral flashes will have the chance to receive immediate...

11/3,K/3 (Item 3 from file: 47)

DIALOG(R)File 47:Gale Group Magazine DB(TM)

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04158408 SUPPLIER NUMBER: 15875930 (USE FORMAT 7 OR 9 FOR FULL TEXT)
A three-dimensional model for the hammerhead ribozyme based on fluorescence measurements. (fluorescence resonance energy transfer)
Tuschl, Thomas; Gohlke, Christoph; Jovin, Thomas M.; Westhof, Eric;
Eckstein, Fritz
Science, v266, n5186, p785(5)
Nov 4, 1994
ISSN: 0036-8075 LANGUAGE: ENGLISH RECORD TYPE: FULLTEXT; ABSTRACT
WORD COUNT: 4420 LINE COUNT: 00342

...AUTHOR ABSTRACT: reference set of labeled RNA duplexes. The FRET efficiencies were predicted on the basis of **vector** algebra analysis, as a function of the relative helical orientations in the ribozyme constructs, and...

TEXT:

...Fig. 1) was originally derived from phylogenetic comparison (3) and later was supported by thermodynamic **nearest - neighbor** calculations (4, 5). Probing of the hammerhead ribozyme with ribonucleases confirmed the predicted base-paired...

... of 5-carboxyfluorescein above the major groove of the 5' labeled base pair. Using cylindrical **polar coordinates** (r, [theta], z) specified by Arnott for A-RNA atoms (19), we located 5-carboxyfluorescein ...

11/3,K/4 (Item 1 from file: 621)
DIALOG(R)File 621:Gale Group New Prod.Annou.(R)
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01095452 Supplier Number: 40636300 (USE FORMAT 7 FOR FULLTEXT)
INVENTION SOFTWARE ADDS FULL COLOR SUPPORT TO EXTENDER GRAFPAK (TM) PLOTTING LIBRARIES
News Release, p1
Jan 5, 1989
Language: English Record Type: Fulltext
Document Type: Magazine/Journal; Trade
Word Count: 271

POST OFFICE BOX 3168,
ANN ARBOR, MICHIGAN 48106
(313) 996-8108

CONTACT: Dale Quantz
Invention Software (313...

...full color line, scatter, x-y,
bar, column, log-log, semi-log, db, and now **POLAR coordinate**
plots in
the user's applications. These plots can be created complete with
customized labels...
...GrafPak continues to be a tremendous time-saver to any
researcher or developer who is **searching** for a quick but extremely
flexible and customizable way to display data in an application...

11/3,K/5 (Item 1 from file: 148)
DIALOG(R)File 148:Gale Group Trade & Industry DB
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08857422 SUPPLIER NUMBER: 18556017
Spatial statistics and GIS; software tools to quantify spatial patterns.
Levine, Ned
Journal of the American Planning Association, v62, n3, p381(11)
Summer, 1996
ISSN: 0194-4363 LANGUAGE: English RECORD TYPE: Fulltext; Abstract
WORD COUNT: 7478 LINE COUNT: 00613

TEXT:

...use GIS to isolate geographical areas, subpopulations, land uses, and road systems according to various **search** criteria, extracting objects on the basis of geographical or attribute conditions. The existing GIS packages...

...smaller objects, as well as implementing a whole range of database functions (e.g., conditional **queries**, object **queries**).

... The SPACE module, which is oriented towards spatial analysis, performs two basic functions: a radial **search** for incidents from a selected point and the identification of the highest concentrations of incidents within a study area.

The required **data** for the **SPACE** module are an identification number and the X and Y coordinates of a series of...

...coordinates, and vice versa.

The user must specify the limits of the area to be **searched** (the minimum and maximum X and Y coordinates) as well as a **search** radius, which is a circular area within which the program **searches** for points that cluster together. The program then implements a complex **search** algorithm, looking for hot spot areas.(5) The program outputs the data in a choice...

...into other GIS programs (e.g., ATLAS*GIS, ARC/INFO).

The user can specify different **search** radii and rerun the routine. Given the same area boundary, different **search** radii will often produce slightly different numbers of hot clusters. Currently, there is not a theoretical basis for choosing **search** radii, and experimentation and experience guide the choice (e.g., multiples of 1/8 mile; having an equal number of cases in each ellipse).

Returning to figure 1, with a **search** radius of 1,000 feet, the STAC program calculated three ellipses of damaged buildings within...

...and each point assigned to one, and only one, cluster). Instead, one has to use **search** algorithms, such as that used by STAC. The program has been used by police departments...maximum concentration and one along an axis 90 (degrees) to that, defining an ellipse); the **nearest neighbor** index (Hammond and McCulloch 1978; Cressie 1991); Moran's "I", which is one of the...

...is 3.3. Unlike other statistical packages, it is an object-based language with the **vector** - a single row or column of numbers or characters - being the basic data unit; **vectors** can be combined into matrices, arrays, data frames, and other data structures. Each command involves...is Ripley's "K-function" (Ripley 1976, 1981; Cressie 1991, 639-43). One problem with **nearest - neighbor** analysis is that only a single distance for each point is examined, that to its **nearest neighbor**; information about the distance to other points is disregarded. Ripley's K-function uses the...

...an angular band (i.e., "pie slices") from the origin; that is, it is a **polar coordinate** band that is 10 (degrees) wide, starting at - 5 (degrees) -+5 (degrees) along the X...to be input and to be transformed. SpaceStat allows the importation of files from several **vector** and raster GIS packages (ARC/ INFO, Idrisi, OSU-Map-for-the-PC). The second module... Government prize from the Kennedy School at Harvard University.

5. I do not discuss the **search** algorithm, because it is complicated. Interested readers should contact the Illinois Criminal Justice Information Authority...

11/3,K/6 (Item 2 from file: 148)
DIALOG(R)File 148:Gale Group Trade & Industry DB
(c)2002 The Gale Group. All rts. reserv.

03500565 SUPPLIER NUMBER: 06321829 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Index of employers. (hospital profiles) (Nursing Opportunities supplement)

RN, v51, n1, pS6(377)

Jan, 1988

ISSN: 0033-7021

LANGUAGE: ENGLISH

RECORD TYPE: FULLTEXT

WORD COUNT: 210302

LINE COUNT: 18943

... 60,000 people per year. Nursing care includes health maintenance and teaching activities. Nurse **coordinated** teams provide care to patients of all ages. The Center's unique family orientation enables...

11/3,K/7 (Item 1 from file: 98)

DIALOG(R)File 98:General Sci Abs/Full-Text

(c) 2002 The HW Wilson Co. All rts. reserv.

04001748 H.W. WILSON RECORD NUMBER: BGS199001748 (USE FORMAT 7 FOR FULLTEXT)

Floral symmetry and its role in plant-pollinator systems: terminology, distribution, and hypotheses.

Neal, Paul R

Dafni, Amots; Giurfa, Martin

Annual Review of Ecology and Systematics (Annu Rev Ecol Syst) v. 29 ('98)
p. 345-73

SPECIAL FEATURES: bibl il ISSN: 0066-4162

LANGUAGE: English

COUNTRY OF PUBLICATION: United States

WORD COUNT: 13353

(USE FORMAT 7 FOR FULLTEXT)

TEXT:

... assessed in relation to the principal axis of the flower (i.e. the line or **vector** emanating from the center of the receptacle) (129). Accordingly, we address symmetry of the flower...flower as the plane that passes through the principal axis (i.e. the line or **vector** emanating from the center of the receptacle) and the subtending leaf. Actinomorphic and disymmetric forms...

...results in the strobiloid deposition of pollen (i.e. on the ventral surface of the **vector**). Most authorities classify such flowers as radially symmetrical (i.e. actinomorphic) based on the form...of floral organs (e.g. petals and stamens, or stamens and pistil) (13, 133). The **polar coordinate** model for zygomorphy builds on the ABC model to hypothesize that another gene(s) varies...

...through the vertical axis of the flower (7, 12, 79). There is, thus, a unique **polar coordinate** specified for each floral organ and the result is reflectional symmetry. This model explains several...opposing hypotheses. Some hypotheses are based on proximate factors (e.g. behavior patterns of pollen **vectors**) that may ultimately affect reproductive success (e.g. increased efficiency). Other hypotheses begin with the...

...increased outcrossing is advantageous) and work toward proximate factors (e.g. pollen placement on the **vector**). Despite this, hypotheses can be placed into four operational groups (with significant overlap) based on... suggests that the dependence of plants on pollinators allows the discriminatory properties of the pollen **vectors** to be interjected into the pollination process (87, 88). The suggested benefits of lower levels... controlling for petal size, that bees preferentially visited flowers that were more symmetrical than their **nearest neighbors** in 7 of 10 species of plants studied (6 with radially symmetrical flowers, 4 with... the possibility of self-pollination resulting from the cloud of dry pollen released as the **vector** usually a bee (6) vibrates the anthers. Fenster (34) compared enantiomorphy to heterostyly and suggested...

11/3,K/8 (Item 1 from file: 553)

DIALOG(R)File 553:Wilson Bus. Abs. FullText

(c) 2002 The HW Wilson Co. All rts. reserv.

04275207 H.W. WILSON RECORD NUMBER: BWBA00025207 (USE FORMAT 7 FOR FULLTEXT)

Michigan tops mountain, 'threepeats' for SS Governor's Cup.

AUGMENTED TITLE: corporate facilities expansions; cover story

Lyne, Jack

Site Selection v. 45 no2 (Mar. 2000) p. 230-47

LANGUAGE: English

WORD COUNT: 6139

(USE FORMAT 7 FOR FULLTEXT)

TEXT:

... R&D expansion in Buffalo. Spurred by a contract to build 6,000 U.S. **Post Office** vehicles, Ford is also adding 300 employees at its electric-car manufacturing plant in Rome...

...million in incentives that sealed the deal. "The Tellabs decision shows that when state and **local** officials **coordinate** their economic development efforts, everyone wins," explained Pam McDonough, Illinois Dept. of Commerce and Community...surveyed quarterly for new facility and expansion data. In addition, we gather data through online **searches** (particularly valuable in tracking the latest developments), news clippings, press releases and telephone contacts with...

11/3,K/9 (Item 1 from file: 88)

DIALOG(R)File 88:Gale Group Business A.R.T.S.

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05782993 SUPPLIER NUMBER: 75104649

Proprioception From a Spinocerebellar Perspective.

BOSGO, G.; POPPELE, R. E.

Physiological Reviews, 81, 2, 539

April, 2001

ISSN: 0031-9333 LANGUAGE: English RECORD TYPE: Fulltext

WORD COUNT: 21605 LINE COUNT: 01770

... skin, central organizations can be readily analyzed in terms of a topological mapping that conserves **nearest neighbor** relationships (e.g., Refs. 43, 44). It has been tempting, therefore, to extend this concept...any single joint representation (38). In fact, linear relationships between unit activity level and the **polar coordinates** of limb axis length and orientation consistently explained the greatest percentage of variance in unit...

...a large range of limb positions. Thus the data representing limb positions in a three- **dimensional** joint-angle **space** fall on a plane rather than being scattered throughout the space as expected if joint...AND SCHWARTZ AB. Primate motor cortex and free arm movements to visual targets in three- **dimensional space**, II. Coding of the direction of movement by a neuronal population. J Neurosci 8: 2928...1998.

(303.) SOECHTING JF AND FLANDERS M. Sensorimotor representations for pointing to targets in three- **dimensional space**. J Neurophysiol 62: 582-594, 1989.

(304.) SOECHTING JF AND FLANDERS M. Errors in pointing...

...J Neurophysiol 62: 595-608, 1989.

(305.) SOECHTING JF AND FLANDERS M. Moving in three- **dimensional space**: frames of reference, **vectors**, and coordinate systems. Annu Rev Neurosci 15: 167-191, 1992.

(306.) STEIN BE AND MEREDITH...

11/3,K/10 (Item 2 from file: 88)

DIALOG(R)File 88:Gale Group Business A.R.T.S.

(c) 2002 The Gale Group. All rts. reserv.

05562395 SUPPLIER NUMBER: 65348173

A Nation of Organizers: The Institutional Origins of Civic Voluntarism in the United States.

Skocpol, Theda; GANZ, MARSHALL; MUNSON, ZIAD
American Political Science Review, 94, 3, 527
Sept, 2000

ISSN: 0003-0554 LANGUAGE: English RECORD TYPE: Fulltext
WORD COUNT: 15252 LINE COUNT: 01288

... realized "the impracticality" and "especial unfitness for this country" of English-style governing arrangements (which **coordinated local** lodges through national committees of notables) and "found their model in the political framework of...civic organizers. Strangers who shared the bond of membership in a nationwide association could **coordinate** their efforts, and **local** activists could contact leaders at higher levels for guidance and reinforcement. Based on primary testimonies...

...about starting a Lodge. I was requested to drop Bro Heisser a line through the **Post office** and unite our efforts which request was complied with....

Saturday evening June 25 1870...authority and member engagement, America's great voluntary federations could help geographically mobile citizens create, **coordinate**, and sustain **local** voluntary groups as well as simultaneously generate sufficient clout to affect politics or societal mores...Los Angeles: University of California Press.

Sandel, Michael J. 1996. Democracy's Discontent: America in **Search** of a Public Philosophy. Cambridge, MA: Harvard University Press.

Schier, Steven E. 2000. By Invitation...s Clubs. Washington, DC: General Federation of Women's Clubs.

Wiebe, Robert H. 1967. The **Search** for Order, 1877-1920. New York: Hill and Wang.

Will, George. 1995. "Look at All...

11/3,K/11 (Item 3 from file: 88)
DIALOG(R)File 88:Gale Group Business A.R.T.S.
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05425039 SUPPLIER NUMBER: 62257652

Data Clustering: A Review.

JAIN, A.K.; MURTY, M.N.; FLYNN, P.J.
ACM Computing Surveys, 31, 3, 264
Sept, 1999

ISSN: 0360-0300 LANGUAGE: English RECORD TYPE: Fulltext
WORD COUNT: 30715 LINE COUNT: 02521

... analysis. Cluster analysis is the organization of a collection of patterns (usually represented as a **vector** of measurements, or a point in a **multidimensional space**) into clusters based on similarity.

Intuitively, patterns within a valid cluster are more similar to...is difficult for humans to obtain an intuitive interpretation of data embedded in a high- **dimensional space**. In addition, data hardly follow the "ideal" structures (e.g., hyperspherical, linear) shown in Figure...with clustering include unsupervised learning (Jain and Dubes 1988), numerical taxonomy (Sneath and Sokal 1973), **vector** quantization (Oehler and Gray 1995), and learning by observation (Michalski and Stepp 1983). The field...

...NOTATION

The following terms and notation are used throughout this paper.

-- A pattern (or feature **vector**, observation, or datum) x is a single data item used by the clustering algorithm. It typically consists of a **vector** of d measurements: $x = ((x_{sub.1}), \dots (x_{sub.d}))$.

-- The individual scalar components ($x_{sub.1}, \dots, x_{sub.d}$)

...into two or more clusters, since it is not compact. If, however, one uses a **polar coordinate** representation for the clusters, the radius coordinate exhibits tight clustering and a one-cluster solution...

GORDON, A. D...

...676.

GOWDA, K. C. AND KRISHNA, G. 1977. Agglomerative clustering using the concept of mutual **nearest neighborhood**. Pattern Recogn. 10, 105-112.

GOWDA, K. C. AND DIDAY, E. 1992. Symbolic clustering using...

...368 -378.

GOWER, J. C. AND ROSS, G. J. S. 1969. Minimum spanning trees and **single - linkage** cluster analysis. Appl. Stat. 18, 54-64.

GREFFENSTETTE, J 1986. Optimization of control parameters for...

...A. 1975. Clustering Algorithms. John Wiley and Sons, Inc., New York, NY.

HEDBERG, S. 1996. **Searching** for the mother lode: Tales of the first data miners. IEEE Expert 11, 5 (Oct...Neural Networks.

ISMAIL, M. A. AND KAMEL, M. S. 1989. Multidimensional data clustering utilizing hybrid **search** strategies. Pattern Recogn. 22, 1 (Jan. 1989), 75-89.

JAIN, A. K. AND DUBES, R...

...R. A. AND PATRICK, E. A. 1973. Clustering using a similarity method based on shared **near neighbors**. IEEE Trans. Comput. C-22, 8 (Aug.), 1025-1034.

JOLION, J.-M., MEER, P., AND...19.

OEHLER, K. L. AND GRAY, R. M. 1995. Combining image compression and classification using **vector** quantization. IEEE Trans. Pattern Anal. Mach. Intell. 17, 461-473.

OJA, E. 1982. A simplified...World Wide Web (Santa Clara, CA, Apr.), [http://theory.stanford.edu/people/wass/publications/Web Search /Web Search .html](http://theory.stanford.edu/people/wass/publications/Web_Search/Web_Search.html).

ZADEH, L. A. 1965. Fuzzy sets. Inf. Control 8, 338-353.

ZAHN, C. T...

11/3,K/12 (Item 4 from file: 88)

DIALOG(R)File 88:Gale Group Business A.R.T.S.

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05072198 SUPPLIER NUMBER: 20424165

Texture mapping 3D models of real-world scenes.

Weinhaus, Frederick M.; Devarajan, Venkat

ACM Computing Surveys, v29, n4, p325(41)

Dec, 1997

ISSN: 0360-0300 LANGUAGE: English RECORD TYPE: Fulltext; Abstract

WORD COUNT: 21175 LINE COUNT: 01754

... below the terrain elevation, the ray has pierced the terrain. See Figure 4. Then a **nearest - neighbor** or higher-order interpolation, such as bilinear, cubic convolution, or windowed sinc function, can be ... speedups can be achieved for each subsequent pixel along a screen column by starting the **search** each time from the last intersection rather than from the (X, Y) coordinate of the...

...before ray-tracing, they processed both the terrain elevation array and the image into a **polar coordinate** system centered at the (X, Y) position of the eye point. They also processed the...the overlapping images is used, where the weights are the angular deviations of the viewing **vectors** of each source image from that of the output view. Moreover, to avoid visible "seams...WINNER, S., SCHEDIWIY, B., DUFFY, C., AND HUNT, N. 1988. The triangle processor and normal **vector** shader: A VLSI system for high performance graphics. Computer Graphics (Proceedings of SIGGRAPH), ACM SIGGRAPH...

11/3,K/13 (Item 5 from file: 88)

DIALOG(R)File 88:Gale Group Business A.R.T.S.

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04255794 SUPPLIER NUMBER: 19385392

Beating B-1 Bob: how underdog Democrat Loretta Sanchez ended Bob Dornan's congressional career. (Case Study)

Wachob, Bill; Kennedy, Andrew
Campaigns & Elections, v18, n1, p32(3)
Feb, 1997

ISSN: 0197-0771 LANGUAGE: English RECORD TYPE: Fulltext; Abstract
WORD COUNT: 2171 LINE COUNT: 00173

... enthusiasm. But she was different - at one point even taking bags of mail to the **post office** so they would be sure to drop on time: that's after she put labels...committee community that Dornan was in fact in serious danger.

With Dornan in obvious panic **searching** for a life boat, we began airing two additional spots, both 30 seconds. One ad...

...the bulk of the Sanchez mail assault focused on persuasion, John Shallman worked with the **coordinated** campaign and a **local** Assembly candidate to fashion a considerable get-out-the-vote and absentee mail program targeted...

11/3,K/14 (Item 6 from file: 88)

DIALOG(R)File 88:Gale Group Business A.R.T.S.
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03631054 SUPPLIER NUMBER: 16946963

Numerical simulation of fiber orientation in injection molding of short-fiber-reinforced thermoplastics.

Chung, S.T.; Kwon, T.H.
Polymer Engineering and Science, v35, n7, p604(15)
April 15, 1995

ISSN: 0032-3888 LANGUAGE: English RECORD TYPE: Fulltext; Abstract
WORD COUNT: 6619 LINE COUNT: 00528

...AUTHOR ABSTRACT: each element across the thickness of molded parts with appropriate tensor transformations for arbitrary three- **dimensional** cavity **space** .

... is the use of a probability distribution function, [Psi], which is associated with a unit **vector** \mathbf{p} along the axis of the fiber indicating the orientation. The distribution function, [Psi](\mathbf{p} ...number of fibers per unit volume

h = average distance from a given fiber to its **nearest neighbors**

In the present simulation, it is assumed that the average distance from a given fiber to its **nearest neighbors**, h is linear in terms of the scalar measure of orientation f . When the number...velocity in the x and y directions, respectively. It should be noted that the velocity **vector** is not in the direction of $-\nabla p$, which is different from a fundamental characteristic...

...same finite element mesh as is used for the mold filling analysis, based on its **local coordinate** system, as shown in Fig. 1. This method is useful because the velocity gradient field is calculated based on the **local coordinate** system from the filling analysis, and the flowability constants in Eq. 15 are determined at Fig. 2, the directional derivatives of the orientation tensor components, based on the **local coordinate** system of element (e), between centroids of element (e) and element ([e.sub.k]) are given by

[Mathematical Expression Omitted]

where [Mathematical Expression Omitted] is a unit **vector** of a **vector** [Mathematical Expression Omitted], directed from the centroid of element (e) to that of element ([e...]

...one needs the tensor transformation of orientation state of element ([e.sub.k]) to the **local coordinate** system of element (e). As a special case, when the plane of element (e) is...scheme for the convection terms. The calculation of the orientation tensor is based on the **local coordinate** system of each element. So, tensor transformation of the

orientation tensor is required between the...
...evaluate the convection terms when the melt flows across the fold in an arbitrary three- **dimensional** cavity **space** . In this way it is possible to predict the transient fiber orientation state in an...

11/3,K/15 (Item 7 from file: 88)
DIALOG(R)File 88:Gale Group Business A.R.T.S.
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03199833 SUPPLIER NUMBER: 14362259
Public administration and government 1991-2.
Gray, Andrew; Jenkins, Bill
Parliamentary Affairs, v46, n1, p17(21)
Jan, 1993
ISSN: 0031-2290 LANGUAGE: English RECORD TYPE: Fulltext; Abstract
WORD COUNT: 10154 LINE COUNT: 00818

... the reforms was not helped by Mr Winterton's committee.
Investigation of witnesses was often **searching** , especially on the early planning and implementation of the forms. There were frequent disputes over ...to contract out more local authority services, to privatise British Rail and to end the **Post Office** 's monopoly. The Financial Times noted (23 July 1991) that, while it was based on...not as welcoming, and various voices could be heard complaining that this was less a **search** for quality than an effort to privatise the public sector by stealth. These suspicions deepened...

...somewhat empty and the remaining assets, of which the railways, the coal industry and the **post office** have figured prominently, pose particular problems.

There have been, for example, at least four recent...pay could be held down as manager's seek to cut costs and establish informal **local** cartels to **coordinate** pay determination, it is also clear that trusts have the power to improve wage levels...

11/3,K/16 (Item 1 from file: 635)
DIALOG(R)File 635:Business Dateline(R)
(c) 2002 ProQuest Info&Learning. All rts. reserv.

0169826 90-53330
County Plots Strategy for Growth
Johnson, Claire
The Billings Gazette (Billings, MT, US), V106 N158 sB p1
PUBL DATE: 901007
WORD COUNT: 2,456
DATELINE: Billings, MT, US

TEXT:

...offices of the Planning Department, county commissioners, clerk and recorder, city clerk, library and Broadview **post office** .

ENVIRONMENT

The Planning Department has identified the environment portion of the comprehensive plan as the...funding in a depressed economy. Nonprofit institutions that depend on public money are forced to **search** for alternative funding sources, and privately-operated cultural facilities face similar difficulty as competition for...of the county population.

Remaining economic goals include:

- * Expansion of existing area businesses.
- * Conducting a **coordinated** effort for **local** economic development.
- * Providing a healthy atmosphere for economic development.

The report says officials should support...

11/3,K/17 (Item 1 from file: 370)

DIALOG(R)File 370:Science

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00501363 (USE 9 FOR FULLTEXT)

TRUST: A Deterministic Algorithm for Global Optimization

Barhen, Jacob; Protopopescu, Vladimir; Reister, David

Center for Engineering Systems Advanced Research, Oak Ridge National
Laboratory, Oak Ridge, TN 37831-6355, USA.

Science Vol. 276 5315 pp. 1094

Publication Date: 5-16-1997 (970516) Publication Year: 1997

Document Type: Journal ISSN: 0036-8075

Language: English

Section Heading: Reports

Word Count: 3761

(THIS IS THE FULLTEXT)

...Text: out without affecting the locations and magnitudes of the other minima. Thus, short of exhaustive **search**, it would appear to be very difficult to design unfallible methods to locate the absolute...

...bounded function with a finite number of discontinuities, and x be an n -dimensional state **vector**. For $n = 1$, we denote the state variable by x . At any discontinuity point x ...

...and the set D will be referred to as the set of feasible solutions (or **search** space). The goal is to find the state **vector** $x_{sup}(gm)$ that minimizes $f(x)$ in D . The index gm stands for global...For 1D problems, the TRUST algorithm is designed to sweep the whole **search** space and thus find the global minimum for any bounded lower semicontinuous function with a... The idea is to construct a 1D curve that "covers" the **n - dimensional** phase **space** of the problem. An approximate realization has been proposed (B7) . Instead of actually "filling" the...the upper bound of $E_{inf}(k)$ in terms of S and R . Using a **polar coordinates** representation for the trace data $D_{inf}(ft)$, that is, $D_{inf}(ft) = a_{inf}...$ et al. Reference B23 or Schneider et al. Reference B24 ; MLSL is the multiple-level **single - linkage** method of Kan and Timmer Reference B25 ; IA is the interval arithmetic technique of Ratschek...

...the tunneling method of Levy and Montalvo Reference B26 ; and TS refers to the taboo **search** scheme of Cvijovic and Klinowski Reference B12 .

Method	Test function				
	BR	CA	GP	RA	SH...

11/3,K/18 (Item 1 from file: 20)

DIALOG(R)File 20:Dialog Global Reporter

(c) 2002 The Dialog Corp. All rts. reserv.

20877547 (USE FORMAT 7 OR 9 FOR FULLTEXT)

Sabaya kin holding Burnhams-AFP

SECTION TITLE: Front Page

Julie S. Alipala and Carlito Pablo

PHILIPPINE DAILY INQUIRER, p1

January 23, 2002

JOURNAL CODE: WDPI LANGUAGE: English RECORD TYPE: FULLTEXT

WORD COUNT: 1416

(USE FORMAT 7 OR 9 FOR FULLTEXT)

... are fed well and are taken care of properly."
Cimatu said the military was now **searching** Maluso for the hostages.

"Because these (moves) are purely operational in nature, I am not...

...Staff and one of those present at the meeting.

Piad said the agents would closely **coordinate** with **local** police in the investigation.

He later said that the agents' visit was "an ordinary thing...for DNA testing had gotten mixed up with letters suspected to contain anthrax at a **post office** in Arizona.

According to Director Lucas Managuelod, head of the PNP Directorate for Investigation and...

14/3,K/1 (Item 1 from file: 98)
DIALOG(R)File 98:General Sci Abs/Full-Text
(c) 2002 The HW Wilson Co. All rts. reserv.

04041999 H.W. WILSON RECORD NUMBER: BGSA99041999 (USE FORMAT 7 FOR FULLTEXT)

Comparison of the entropy technique with two other techniques for detecting disease clustering using data from children with high blood lead levels.

AUGMENTED TITLE: with appendixes

Swartz, Joel B

Rothenberg, Stephen J; Teklehaimanot, Senait

American Journal of Epidemiology (Am J Epidemiol) v. 149 no8 (Apr. 15 1999)
p. 750-60

SPECIAL FEATURES: bibl il ISSN: 0002-9262

LANGUAGE: English

COUNTRY OF PUBLICATION: United States

WORD COUNT: 6890

(USE FORMAT 7 FOR FULLTEXT)

TEXT:

... 2 (Biomedware, Ann Arbor, Michigan). For both the entropy method and Moran's IPOP, the **space** was **divided** into square **cells** using grids with the following dimensions: 5 X 5, 7 X 7, 9 X 9. STAT Version 2.02 reports p values for all numbers of **nearest neighbors** from 1 to 10. It also reports two summary significance values taking into account all... individual significance tests. We calculated the probability of certain individual values for specific numbers of **nearest neighbors**. Because the entropy method and Moran's IPOP both use the same grid sizes, and...

...In almost all instances, the scale factor, i.e., the grid size or number of **nearest neighbors** used in the NNT computation was not a factor in the performance of either the...

14/3,K/2 (Item 2 from file: 98)
DIALOG(R)File 98:General Sci Abs/Full-Text
(c) 2002 The HW Wilson Co. All rts. reserv.

03550656 H.W. WILSON RECORD NUMBER: BGS197050656

Prion (PrPSc)-specific epitope defined by a monoclonal antibody.

Korth, C

Stierli, B; Streit, P

Nature (Nature) v. 390 (Nov. 6 '97) p. 74-7

SPECIAL FEATURES: bibl il ISSN: 0028-0836

LANGUAGE: English

COUNTRY OF PUBLICATION: United Kingdom

...ABSTRACT: but not PrPC. Mapping studies revealed that the 15B3 epitope in PrP comprises 3 polypeptide **segments**, only 2 of which are **near neighbors** in **space**. Intermolecular contacts in oligomeric forms of PrP or intramolecular rearrangements in the protein may ensure...

14/3,K/3 (Item 1 from file: 370)
DIALOG(R)File 370:Science
(c) 1999 AAAS. All rts. reserv.

00501636 (USE 9 FOR FULLTEXT)

Competing Interactions and Levels of Ordering in Self-Organizing Polymeric Materials

Muthukumar, M.; Ober, C. K.; Thomas, E. L.

M. Muthukumar is in the Department of Polymer Science and Engineering, University of Massachusetts, Amherst, MA 01003-4530, USA. C. K. Ober is in the Department of Materials Science and Engineering, Cornell University, Ithaca, NY 14853-1501, USA. E. L. Thomas is in the Department of Materials Science and Engineering, Massachusetts Institute of Technology, Cambridge, MA 02139-4307, USA.

Science Vol. 277 5330 pp. 1225
Publication Date: 8-29-1997 (970829) Publication Year: 1997
Document Type: Journal ISSN: 0036-8075
Language: English
Section Heading: Articles
Word Count: 6248

(THIS IS THE FULLTEXT)

...Text: are $(q - 1).sup(2)$ and $(q + 1).sup(2)$, respectively, accounting for only the **nearest neighbor** interaction...

...example of a hypothetical complex MDP is sketched in Fig. 1C, where various functional building **blocks** (domains) are connected through covalent bonding with the use of flexible **spacer segments**. In this case, the domains replace monomers as building units in polymer synthesis ...

...solvable model (B7) . For specificity, consider the self-association of four domains sequentially connected by **spacer** links, each with $m - 1$ **segments** . There are four distinct ways any two of these domains can pair (Fig. 2 A...k) where $(\psi)(r)$ is decomposed into the Fourier modes (k) being the reciprocal wave **vector**), and $(\Gamma)(k)$ is of the form $(\Gamma)(k) = A + Bk.sup(2) + C/k...$

·?ds

Set	Items	Description
S1	90	POLAR(3N)CARTESIAN(3N) (CONVERT? OR CONVERSION?)
S2	57	RD (unique items)

?show files

File 275:Gale Group Computer DB(TM) 1983-2003/Jan 29
(c) 2003 The Gale Group

File 2:INSPEC 1969-2003/Jan W3
(c) 2003 Institution of Electrical Engineers

File 6:NTIS 1964-2003/Jan W4
(c) 2003 NTIS, Intl Cpyrght All Rights Res

File 16:Gale Group PROMT(R) 1990-2003/Jan 28
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File 148:Gale Group Trade & Industry DB 1976-2003/Jan 29
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File 95:TEME-Technology & Management 1989-2003/Jan W2
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File 73:EMBASE 1974-2003/Jan W4
(c) 2003 Elsevier Science B.V.

File 155:MEDLINE(R) 1966-2003/Jan W4

File 144:Pascal 1973-2003/Jan W3
(c) 2003 INIST/CNRS

?

2/7,K/2 (Item 2 from file: 275)
DIALOG(R) File 275:Gale Group Computer DB(TM)
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01314565 SUPPLIER NUMBER: 07909062 (THIS IS THE FULL TEXT)
User-defined painting tools push Mac color. (Macintosh Graphic Arts)
Andres, Clay
MacWEEK, v3, n42, p63(2)
Nov 21, 1989

TEXT:

By Clay Andres

Although there has been a color Macintosh since 1987, desktop color is only now starting to gain momentum. A new crop of color input and output devices and new compression and calibration technologies are expected to make the Mac the computer of choice for desktop color.

Macintosh painting and illustration programs have also played a crucial role in the evolution of color technology on the desktop. From no color to eight-bit color to true, or 32-bit, color support, the new generation of Mac applications promises to offer professional graphic artists professional graphics capabilities.

Brush tools. Studio/8 from Electronic Arts of San Mateo, Calif., and several other programs have the capability to create brush patterns from an actual painting. While Cynthia Beth Rubin, assistant professor of art at Connecticut College in New London uses this technique in designing an abstract mural, Sandy Chase, a free-lance architectural renderer in Pawley's Island, S.C., uses a similar capability in LaserPaint II from LaserWare of San Rafael, Calif., to achieve near-realism. "It's useful for creating shadows or any texture like water or grass that's difficult to paint," said Chase.

"I'm a photo realist in my illustration technique," said Bert Monroy, a free-lance artist and multimedia consultant in New York. Rather than start with a photograph, Monroy creates photo realism using the special effects in PixelPaint 2.0 from SuperMac Technology of Sunnyvale, Calif. "To make ivy, I choose a small brush, a light green for the foreground and a dark green for the background. With the Cycle Speckle effect I can make the ivy climb a wall."

PixelPaint 2.0 is full of special effects for each tool, and the "niftiest artistic things aren't even documented," said David Biedny, Monroy's partner in the multimedia production firm Incredible/I. "The Warp command is actually a **Cartesian** -to- **polar** coordinate **conversion** in 10 versions -- different for each number in the Mac keypad. You can get a fisheye-lens effect or an image of a pan of water over a picture."

SuperPaint 2.0 from San Diego-based Silicon Beach Software has tried to simulate real paint on a brush with its Wet Brush effect. "Moving the brush faster makes a thin line, and moving slower makes a broad line," said Thomas Rubarth, a free-lance artist in Phoenix, Ariz. "This gives a nice loose effect for textures like leathering or for a looser-looking logo design."

Instead of a wet brush, Modern Artist 2.0 from Computer Friends of Portland, Ore., has a Wet Canvas command. In this mode, the brush simulates running out of paint as you drag it across the frame. LaserPaint II has controls on all of its tools for diameter and flow. The amount of paint on a brush can be adjusted by changing the flow rate.

All of the programs have a palette of monochrome brushes. Modern Artist 2.0 has color paintbrushes as well.

Spraying tools. There are two kinds of spraying tools: a spray can that you just point and spray, and an airbrush that allows you to control the size and rate of the spray. With SuperPaint 2.0, you can also set the dot size.

PixelPaint 2.0 includes special effects for the spray can. "I use the spray can in Cycle Color with a range of greens from light to dark for grass," said Monroy.

Cricket ColorPaint from the Malvern, Pa.-based Cricket Division of Computer Associates can achieve a similar effect with its Texture tool that

sprays in two jets simultaneously. Each jet can be set for color, rate, size, shape and orientation. The tool is useful for two-tone textures like sand and water. But with so many variables in a single tool, it's difficult to remember which settings achieve which effects. Alex Studer, computer graphics coordinator at the Peterson Publishing Co. in Los Angeles, avoids that problem by saving preferred settings as templates.

Spraying is inexact by nature, so most painting programs have some way to mask the art or constrain the spray. NuPaint from NuEquation of Richardson, Texas, has a Masking Tape tool that allows you to mark a boundary shape to include or exclude the spray.

"Masking in Studio/8 gives you more of the feel of using a real airbrush," said Monroy. "And masking colors is wonderful." Pixel-Paint's mask also has the capability to protect a color rather than a shape from spray. "You don't have to commit," said Michael Backes, a movie industry consultant in Los Angeles. "You can paint to a layer and make sure you've got it right. It's the ultimate undo."

Fill and color tools. Painters who don't use an airbrush can use the paint bucket to fill large areas with patterns or colors. Fills also allow you to blend the paint in any direction to create gradients for more-realistic 3-D images or other special effects.

By specifying the starting and ending colors, most programs can generate a gradient fill. They can also adjust the direction of the fill, the speed of the gradient and the amount of dithering to add.

Backes and his partner, Ron Cobb, use PixelPaint 2.0 to deal in realistic images. "I like it because it allows a non-artist to have a lot of control over things that he couldn't draw by hand," said Backes. "Ron is a real painter. He works in fat-bits mode (it's like painting with a one-pixel brush) and then uses the customized fill tools to do directional fills."

You can adjust gradients and fills by editing PixelPaint's color palette to achieve the most realistic effect or simply to change flavors.

Modern Artist has unique Stain and Sunglass tools to change or tint colors within a selection. "I design a lot of quilts," said Marianne Colgrove, co-developer of Modern Artist and technology plan manager at Reed College in Portland, Ore. "I draw the basic outline of the pattern and fill with the paint bucket. Then I use the Stain tool to generate 10 to 20 color combinations before purchasing material.

"For diagrams or more-technical work there are a lot of times when I'm not satisfied with the effect of a color and need a global change," Colgrove added. "With other programs, you can change a color by changing a palette, but you might want more-precise control to change a color in an area."

Selection tools. It is difficult to edit the images in a paint program. You can't go back and adjust shapes the way you can in drawing programs. The program doesn't recognize any relationship between different pixels.

All painting programs have variations of MacPaint's Marquee and Lasso tools that can pick up groups of pixels and edit, move or copy them. The Lasso will try to find an object border and shrink to fit just those pixels, but color gradations, patterned backgrounds and uneven borders can make this difficult.

Studio/8 has a Lasso and two Marquees (rectangle and polygon), two modifying functions to set the selection mode, and a list of commands for manipulating selections once they're made. The selection tools can be set to shrink or expand to a border or remain the shape originally drawn.

LaserPaint II doesn't have the manipulation tools of Studio/8, but the Lasso can be configured in the Mac's eight copy modes, three shrink/expand settings, and five levels of precision, from loose to exact.

"I use the custom Lassos to lift a truck out of a scanned image and put it into another painting," said Studer. Just as he does with LaserPaint's custom airbrushes, Studer keeps templates with each of the custom Lassos he uses most frequently.

Chase uses LaserPaint's Multimode Lassos to make his renderings more realistic. "If you're looking through a building, you need to be able to see the sky," he said. "I can pick up a piece of sky from the scanned photograph and modify it to blend behind the glass."

NuPaint has implemented all eight possible copy modes for its Lasso

.tool, and Modern Artist 2.0 has implemented four of them. But Modern Artist 2.0 can look at external or internal boundaries or pick out an object by color as well.

Conclusions. Although based on MacPaint's original tool palette -- pencil, paintbrush, spray can, paint bucket, eraser and selection tools -- today's industrial-strength Mac software has extended beyond the original painting metaphor of MacPaint to include a range of tools that can be adjusted or modified to suit a full spectrum of applications for professional users.

Computer Friends can be reached at (503) 6336-2291; Cricket Software at (215) 251-9890; Electronic Arts at (415) 571-7171; LaserWare at (415) 453-9500; NuEquation Inc. at (800) 423-6837 or (800) 526-9269 in Texas; Silicon Beach Software at (619) 695-6956; SuperMac Technology at (415) 964-8884.

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... s partner in the multimedia production firm Incredible/I. "The Warp command is actually a **Cartesian** -to- **polar** coordinate **conversion** in 10 versions -- different for each number in the Mac keypad. You can get a...

2/7,K/8 (Item 8 from file: 275)
DIALOG(R) File 275:Gale Group Computer DB(TM)
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01204630 SUPPLIER NUMBER: 05011155 (THIS IS THE FULL TEXT)
Chip converts Cartesian data to polar units at 10 MHz.
Bursky, Dave
Electronic Design, v35, p53(2)
June 11, 1987

TEXT:

Chip converts Cartesian data to polar units at 10 MHz

Phase-related information must be extracted from signals in real time, which demands complex, fast computations. As a result, only the costliest digital-communication and signal-processing systems could take advantage of the received signal's data--that is, until the advent of Plessey's PDSP16330 Pythagorean processor.

The low-power (500-mW) CMOS circuit accepts Cartesian (X, Y) or complex (X iY) data, and computes the instantaneous magnitude and phase at 10 million coordinate points per second.

As the newest member of Plessey's family of digital signal-processing chips, the processor accepts two 16-bit input values, computes the square root of the sum of the squares (magnitude) and the arc tangent from the quotient of X/Y to deliver the phase information (see the figure).

The magnitude is delivered with 16-bit resolution while the phase angle is a 12-bit value representing a full 2 π field; consequently, any phase ambiguities are eliminated. Input values can be in either two's-complement or signed-magnitude formats. With a format (FORM) input line, designers select the number system the chip will deal with.

For radar and sonar signal processing, the chip's Cartesian-to-polar coordinate calculations make it possible for magnitude and phase information to be extracted. Phase data offers valuable characteristics such as total delay and delay distribution across a target, while magnitude data supplies information on total reflected power. The magnitude and phase data can be correlated to identify a target accurately by its shape with phase characteristics and both the target's size and distance through the power values.

DISCRIMINATE TARGETS

With template matching against known target patterns through correlator and spectral matching, distant targets can be identified from one other on a display screen. For instance, because the targets have radically different reflection patterns, one could differentiate between propeller and jet planes.

Secure digital-communication systems will also benefit from the new processor. On the reception side, the chip provides for higher-quality demodulation schemes which means that more complex modulation techniques

that are harder to decode can be used on the transmission side.

Every 100 ns, the chip accepts two 16-bit Cartesian values and delivers the polar equivalent in 24 clock cycles. Internally, the 16330 has 22 levels of pipelining, plus input and output latches to absorb the data at 100-ns intervals.

Each of the chip's 16-bit (X and Y) input data ports has a separate Clock Enable line. The magnitude and phase output ports have separate three-state control lines.

Both the magnitude and phase outputs come in a magnitude format. Phase data is zero for data with a zero Y input and a positive X value, 400 (hexadecimal) for zero X and positive Y values, 800 (hexadecimal) for zero Y and negative X values, and C00 (hexadecimal) for zero X and negative Y values. As a result, a least-significant weighting bit is $2\pi/4096$ radians. The 16-bit magnitude value can be scaled (with the two-line scale input) by internally shifting the number 1, 2, or 3 places in the more-significant value direction, which effectively multiplies the value by 2, 4, or 8.

Under certain conditions, any of the shifts can cause an invalid result at the chip's output port. Those conditions, which are monitored, activate the overflow (OVR) output.

Of the 16330's 84 contacts on its leadless chip-carrier package, 60 are consumed by various data ports. For adequate noise margins, the circuit has 10 ground connections distributed around the package, as well as four pins for the 5-V supply. Output Enable and various clock lines consume six more pins. One additional pin handles format control, another an overflow flag, and two others scaling control.

Photo: Two 16-bit coordinate values are squared and summed and the square-root of the sum is taken by Plessey's Pythagorean processor. Another part of the chip computes the phase angle by taking the arc tangent of the quotient of X/Y.

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Chip converts Cartesian data to polar units at 10 MHz.

TEXT:

Chip converts Cartesian data to polar units at 10 MHz

2/7,K/9 (Item 9 from file: 275)

DIALOG(R)File 275:Gale Group Computer DB(TM)

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01179782 SUPPLIER NUMBER: 05230560

Filter controllers for bank-to-turn CLOS guidance.

(command-to-line-of-sight systems) (technical)

Fleming, R.J.; Irwin, G.W.

IEE Proceedings Part D Control Theory and Applications, v134D, n1, p17(9)
Jan, 1987

CAPTIONS: Bank-to-turn CLOS guidance system. (chart); Single-plane state variable filter-controller system. (chart); Single-plane transfer function filter-controller system. (chart); Variation in phase margin. (table); Variation in gain margin. (table); Variation in bandwidth. (table); Moving target engagement geometry. (table); Variation in miss distance. (table); Gathering performances. (table); Percentage success rates. (table); Single-plane control signal variation of filter, conventional controllers. (table); Missile orientation variation of filter, conventional controllers. (table); **Polar conversion of Cartesian acceleration commands.** (table)

...CAPTIONS: signal variation of filter, conventional controllers. (table); Missile orientation variation of filter, conventional controllers. (table); **Polar conversion of Cartesian acceleration commands.** (table)

2/7,K/13 (Item 4 from file: 2)

DIALOG(R)File 2:INSPEC

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6592795 INSPEC Abstract Number: A2000-12-8760B-026, B2000-06-7510H-028,

.C2000-06-7330-238

Title: A multirate scan conversion method

Author(s): Fritsch, C.; Parrilla, M.; Martinez, O.; Jimenez, D.

Author Affiliation: Inst. de Autom. Ind., Madrid, Spain

Journal: Ultrasonics Conference Title: Ultrasonics (Netherlands)
vol.38, no.1-8 p.179-82

Publisher: Elsevier,

Publication Date: March 2000 Country of Publication: Netherlands

CODEN: ULTRA3 ISSN: 0041-624X

SICI: 0041-624X(200003)38:1/8L.179:MSCM;1-R

Material Identity Number: G499-2000-002

U.S. Copyright Clearance Center Code: 0041-624X/2000/\$20.00

Conference Title: Ultrasonics International 1999 Joint with 1999 World Congress on Ultrasonics

Conference Date: 29 June-1 July 1999 Conference Location: Lyngby, Denmark

Language: English Document Type: Conference Paper (PA); Journal Paper (JP)

Treatment: Practical (P)

Abstract: B-mode ultrasonic imaging requires that the acquired **polar** coordinate ultrasound data be **converted** to the **Cartesian** format used by digital monitors. Image quality depends on the interpolation algorithm used to this purpose. In this work a selective sampling technique, based on acquiring data at specific points of the scanned area together with a straightforward linear interpolation step, is proposed. Hardware complexity is avoided, because the interpolation task can be carried out by software in real time, concurrently with data acquisition. The performances of the proposed approach are analysed with regard to those provided by other algorithms and some implementation issues are addressed. (9 Refs)

Subfile: A B C

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Abstract: B-mode ultrasonic imaging requires that the acquired **polar** coordinate ultrasound data be **converted** to the **Cartesian** format used by digital monitors. Image quality depends on the interpolation algorithm used to this...

2/7,K/16 (Item 7 from file: 2)

DIALOG(R) File 2:INSPEC

(c) 2003 Institution of Electrical Engineers. All rts. reserv.

5844315 INSPEC Abstract Number: B9804-7950-023

Title: A consistent, debiased method for converting between polar and Cartesian coordinate systems

Author(s): Julier, S.J.; Uhlmann, J.K.

Author Affiliation: Dept. of Eng. Sci., Oxford Univ., UK

Journal: Proceedings of the SPIE - The International Society for Optical Engineering Conference Title: Proc. SPIE - Int. Soc. Opt. Eng. (USA)
vol.3086 p.110-21

Publisher: SPIE-Int. Soc. Opt. Eng,

Publication Date: 1997 Country of Publication: USA

CODEN: PSISDG ISSN: 0277-786X

SICI: 0277-786X(1997)3086L.110:CDMC;1-E

Material Identity Number: C574-97192

U.S. Copyright Clearance Center Code: 0277-786X/97/\$10.00

Conference Title: Acquisition, Tracking, and Pointing XI

Conference Sponsor: SPIE

Conference Date: 23-24 April 1997 Conference Location: Orlando, FL, USA

Language: English Document Type: Conference Paper (PA); Journal Paper (JP)

Treatment: Practical (P); Theoretical (T)

Abstract: A significant problem in tracking and estimation is the consistent transformation of uncertain state estimates between Cartesian and spherical coordinate systems. For example, a radar system generates measurements in its own local spherical coordinate system. In order to

.combine those measurements with those from other radars, however, a tracking system typically transforms all measurements to a common Cartesian coordinate system. The most common approach is to approximate the transformation through linearization. However, this approximation can lead to biases and inconsistencies, especially when the uncertainties on the measurements are large. A number of approaches have been proposed for using higher order transformation modes, but these approaches have found only limited use due to the often enormous implementation burdens incurred by the need to derive Jacobians and Hessians. This paper expands a method for nonlinear propagation which is described in a companion paper. A discrete set of samples are used to capture the first four moments of the untransformed measurement. The transformation is then applied to each of the samples, and the mean and covariance are calculated from the result. It is shown that the performance of the algorithm is comparable to that of fourth order filters, thus ensuring consistency even when the uncertainty is large. It is not necessary to calculate any derivatives (Jacobians, Hessians, etc.), and the algorithm can be extended to incorporate higher order information. The benefits of this algorithm are illustrated in the contexts of autonomous vehicle navigation and missile tracking. (10 Refs)

Subfile: B

Copyright 1998, IEE

Title: A consistent, debiased method for converting between polar and Cartesian coordinate systems

2/7,K/17 (Item 8 from file: 2)

DIALOG(R)File 2:INSPEC

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5818483 INSPEC Abstract Number: B9803-6320-025

Title: High speed digital scan converting algorithm with moire pattern make-up and roaming zoom window

Author(s): Ji Xiuquan; Wang Desheng; Peng Yong

Author Affiliation: Dept. of Electron. Eng., Tsinghua Univ., Beijing, China

Journal: Journal of Tsinghua University (Science and Technology)
vol.37, no.10 p.65-8

Publisher: Tsinghua Univ,

Publication Date: Oct. 1997 Country of Publication: China

CODEN: QDXKE8 ISSN: 1000-0054

SICI: 1000-0054(199710)37:10L.65:HSDS;1-T

Material Identity Number: G276-97007

Language: Chinese Document Type: Journal Paper (JP)

Treatment: Applications (A); Practical (P); Theoretical (T); Experimental (X)

Abstract: Digital scan converter (DSC) is an indispensable part in the display equipment of radar, biomedical ultra-sound detectors, sonar and electronic surface analyzer. To implement the **conversion** from **polar** coordinates to **Cartesian** coordinates, several methods such as multiplication device, accumulator and software converter based on reduced instruction set computer have been reported, but they have the limitations of high cost and low speed. A phenomenon called moire pattern owing to under-sampling and truncation may be observed and it is difficult for such a DSC to open a roaming zoom window. A new DSC scheme of the incremental pulses counter utilizing serial scanning is proposed in this paper. The algorithms of making up moire pattern and opening a zoom window are discussed. An example of radar image display DSC integrated in a field programmable gate array which is based on this algorithm is presented. (10 Refs)

Subfile: B

Copyright 1998, IEE

...Abstract: equipment of radar, biomedical ultra-sound detectors, sonar and electronic surface analyzer. To implement the **conversion** from **polar** coordinates to **Cartesian** coordinates, several methods such as multiplication device, accumulator and software converter based on reduced

.instruction...

2/7,K/18 (Item 9 from file: 2)

DIALOG(R)File 2:INSPEC

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5751850 INSPEC Abstract Number: B9712-6310-047

Title: An efficient radar tracking algorithm using multidimensional Gauss-Hermite quadratures

Author(s): Wing Ip Tam; Hatzinakos, D.

Author Affiliation: Dept. of Electr. & Comput. Eng., Toronto Univ., Ont., Canada

Conference Title: 1997 IEEE International Conference on Acoustics, Speech, and Signal Processing (Cat. No.97CB36052) Part vol.5 p. 3777-80 vol.5

Publisher: IEEE Comput. Soc. Press, Los Alamitos, CA, USA

Publication Date: 1997 Country of Publication: USA 5 vol. (xxii+xxv+xxiv+xxii+4156) pp.

ISBN: 0 8186 7919 0 Material Identity Number: XX97-01342

U.S. Copyright Clearance Center Code: 0 8186 7919 0/97/\$10.00

Conference Title: 1997 IEEE International Conference on Acoustics, Speech, and Signal Processing

Conference Sponsor: IEEE Signal Process. Soc.; DPG; GI; ITG; TUM

Conference Date: 21-24 April 1997 Conference Location: Munich, Germany

Language: English Document Type: Conference Paper (PA)

Treatment: Theoretical (T)

Abstract: In radar tracking the target motion is best modeled in **Cartesian** coordinates. Its position is however measured in **polar** coordinates (range and azimuth). Tracking in **Cartesian** coordinates with noisy **polar** measurements requires either **converting** the measurements to a Cartesian frame of reference and then applying the linear Kalman filter to the converted measurement or using the extended Kalman filter (EKF) in mixed coordinates. The first approach is accurate only for moderate cross-range errors; the second approach is consistent only for small errors. A new efficient tracking algorithm using the multidimensional Gauss-Hermite quadratures to propagate the mean and the covariance of the conditional probability density function is presented. This method is compared with the EKF and the converted measurement Kalman filter (CMKF) and it is shown to be more accurate. (8 Refs)

Subfile: B

Copyright 1997, IEE

Abstract: In radar tracking the target motion is best modeled in **Cartesian** coordinates. Its position is however measured in **polar** coordinates (range and azimuth). Tracking in **Cartesian** coordinates with noisy **polar** measurements requires either **converting** the measurements to a Cartesian frame of reference and then applying the linear Kalman filter ...

2/7,K/19 (Item 10 from file: 2)

DIALOG(R)File 2:INSPEC

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5722081 INSPEC Abstract Number: A9722-0650-002

Title: Rapid and precise method to convert a two dimensional image from Cartesian to polar coordinate system

Author(s): Weimin Wu; Kato, Y.; Yamazaki, K.; Yoshino, M.; Danjo, A.; Kobayashi, N.

Author Affiliation: Dept. of Phys., Tokyo Metropolitan Univ., Japan

Journal: Review of Scientific Instruments vol.68, no.9 p.3490-3

Publisher: AIP,

Publication Date: Sept. 1997 Country of Publication: USA

CODEN: RSINAK ISSN: 0034-6748

SICI: 0034-6748(199709)68:9L:3490:RPMC;1-F

Material Identity Number: R017-97009

. U.S. Copyright Clearance Center Code: 0034-6748/97/68(9)/3490/4/\$10.00

Document Number: S0034-6748(97)03809-4

Language: English Document Type: Journal Paper (JP)

Treatment: Theoretical (T)

Abstract: A method is described to convert a two-dimensional image, which is the pattern of the scattered electrons from on target gas measured by a torodial type analyzer with a detector consists of a pair of multichannel plates and a position sensitive detector from detector's recording system, a Cartesian coordinate system, to a polar coordinate system in which physical quantities (the energy and angle of a scattered electron) are expressed. By this method, the converting coefficients are calculated with high precision and the kernel (nonzero) coefficients are stored for data conversion on disk. Since there is symmetry in the coefficients, only part of the coefficients need to be calculated and stored. A simple method for compressing the storage space of the coefficients also is described. (4 Refs)

Subfile: A

Copyright 1997, IEE

Title: Rapid and precise method to convert a two dimensional image from Cartesian to polar coordinate system

2/7,K/20 (Item 11 from file: 2)

DIALOG(R) File 2:INSPEC

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5550768 INSPEC Abstract Number: A9710-8760J-009, B9705-7510B-112, C9705-7330-219

Title: Fast direct Fourier methods, based on one- and two-pass coordinate transformations, yield accurate reconstructions of X-ray CT clinical images

Author(s): Bellon, P.L.; Lanzavecchia, S.

Author Affiliation: Dipt. di Chimica Strutturale e Stereochimica Inorganica, Milan Univ., Italy

Journal: Physics in Medicine and Biology vol.42, no.3 p.443-63

Publisher: IOP Publishing,

Publication Date: March 1997 Country of Publication: UK

CODEN: PHMBA7 ISSN: 0031-9155

SICI: 0031-9155(199703)42:3L:443:FDFM;1-Y

Material Identity Number: P117-97003

U.S. Copyright Clearance Center Code: 0031-9155/97/030443+21\$19.50

Language: English Document Type: Journal Paper (JP)

Treatment: Practical (P)

Abstract: The **conversion** from **polar** to **Cartesian** coordinates can be carried out with two-pass algorithms. The paper describes two different methods based on concentric square frames and octagonal frames and their results, obtained with accurate interpolations based on the moving window Shannon reconstruction (MWSR). The embedding of these algorithms in direct Fourier methods (DFMs) of tomographic reconstruction is discussed. With respect to one-pass methods and to the use of octagonal frames, the square frame method makes it possible to carry out the first pass, a radial resampling, in the direct space, before computing 1D Fourier transforms (FTs) of projections. Reconstructions of clinical images from the raw data of a third-generation X-ray tomograph are presented and compared with those obtained with one-pass DFMs and with the convolution back-projection method (CBPM) performed by the instrument. The simple algorithm using square frames yields results in complete agreement with other DFM protocols and the CBPM. On a general-purpose computer, the execution of DFM protocols based on one-pass and two-pass coordinate transformations is 35 to 55 times faster than the CBPM and make the algorithms attractive for modern instrumentation. (38 Refs)

Subfile: A B C

Copyright 1997, IEE

Abstract: The **conversion** from **polar** to **Cartesian** coordinates can be carried out with two-pass algorithms. The paper describes two different methods...

.?t s2/7,k/21,24,34,35,40

2/7,K/21 (Item 12 from file: 2)

DIALOG(R)File 2:INSPEC

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5124450 INSPEC Abstract Number: B9601-1265B-075, C9601-5230-015

Title: COordinate rotation DIgital Computer (CORDIC) synthesis for FPGA

Author(s): Meyer-Base, U.; Meyer-Base, A.; Hilberg, W.

Author Affiliation: Inst. fur Datentech., Tech. Hochschule Darmstadt, Germany

Conference Title: Field-Programmable Logic Architectures, Synthesis and Applications. 4th International Workshop on Field-Programmable Logic and Applications, FPL '94. Proceedings p.397-408

Editor(s): Hartenstein, R.W.; Servit, M.Z.

Publisher: Springer-Verlag, Berlin, Germany

Publication Date: 1994 Country of Publication: West Germany xi+434

pp.

ISBN: 3 540 58419 6

Conference Title: Field-Programmable Logic. Architectures, Synthesis and Applications. 4th International Workshop on Field-Programmable Logic and Applications, FPL '94. Proceedings

Conference Date: 7-9 Sept. 1994 Conference Location: Prague, Czech Republic

Language: English Document Type: Conference Paper (PA)

Treatment: Applications (A); Practical (P); Theoretical (T)

Abstract: Universal CORDIC processors are able to compute a wide variety of functions, for example **conversion** between **polar** and **cartesian** coordinates, trigonometric (sin, cos, tan and vice versa), division, hyperbolic and exponential functions. Because CORDIC needs only simple add/subtract and shift operations, it is easy to realize it with FPGAs. We explain the CORDIC synthesis in different architectures and of different accuracies. We examine the CORDIC synthesis for coordinate **conversion** from **cartesian** to **polar** X, Y to R, theta and for computing the exponential function with the CORDIC processor supporting a former implemented artificial neural network. With our optimization the hardware effort of the CORDIC could be reduced, so that each processor may be implement each with one XC3090 FPGA from Xilinx. (18 Refs)

Subfile: B C

Copyright 1995, IEE

Abstract: Universal CORDIC processors are able to compute a wide variety of functions, for example **conversion** between **polar** and **cartesian** coordinates, trigonometric (sin, cos, tan and vice versa), division, hyperbolic and exponential functions. Because CORDIC...

... synthesis in different architectures and of different accuracies. We examine the CORDIC synthesis for coordinate **conversion** from **cartesian** to **polar** X, Y to R, theta and for computing the exponential function with the CORDIC processor...

2/7,K/24 (Item 15 from file: 2)

DIALOG(R)File 2:INSPEC

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03818266 INSPEC Abstract Number: A91023030, C91018134

Title: Real-time density computer for two-color interferometers

Author(s): Innocente, P.; Martini, S.; Corradi, G.; Fadin, G.; Fasoli, C.; Garonzi, G.

Author Affiliation: Istituto Gas Ionizzati, ENEA-CNR, Padova, Italy

Journal: Review of Scientific Instruments vol.61, no.10, pt.2 p.

2876-8

Publication Date: Oct. 1990 Country of Publication: USA

CODEN: RSINAK ISSN: 0034-6748

U.S. Copyright Clearance Center Code: 0034-6748/90/102876-03\$02.00

Conference Title: 8th Topical Conference on High Temperature Plasma

.Diagnostics

Conference Date: 6-10 May 1990 Conference Location: Hyannis, MA, USA

Language: English Document Type: Conference Paper (PA); Journal Paper (JP)

Treatment: Practical (P); Theoretical (T)

Abstract: An electronic circuit has been developed which performs real-time density computation on the quadrature phase signals of the two-color CO/sub 2/ interferometer for the RFX experiment. **Cartesian -to- polar coordinate conversion** is obtained by a look-up table, and a 'phase fine tuning' table allows one to introduce corrections to the systematic phase nonlinearity errors of the interferometer, by which the overall accuracy of the diagnostic is made better than 1 degrees, equivalent to a line density of $6 \times 10^{17} \text{ m}^{-2}$ for a CO/sub 2/ system. The total phase range is ± 512 fringes and the maximum allowed rate of change is $125 \times 10^3 \text{ m}^{-2} \text{ s}^{-1}$ equivalent to a density rate of change of $2 \times 10^{25} \text{ m}^{-2} \text{ s}^{-1}$. A real-time signal proportional to the plasma density to be used for density feedback is provided by a 50 kHz, 12 bit converter. The system is a triple-width CAMAC module and the two-color wavelength ratio is remotely programmable as a 20 bit constant, hence it is suitable in general for any two-color interferometer. The density data are also stored with a sampling rate of 10-250 kHz in a 128 K*24 bit memory buffer, which is interfaced via a CAMAC bus to the data acquisition system. (9 Refs)

Subfile: A C

...Abstract: quadrature phase signals of the two-color CO/sub 2/ interferometer for the RFX experiment. **Cartesian -to- polar coordinate conversion** is obtained by a look-up table, and a 'phase fine tuning' table allows one...

2/7,K/34 (Item 25 from file: 2)

DIALOG(R)File 2:INSPEC

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00909103 INSPEC Abstract Number: B76021832

Title: Polar to cartesian axis-transforming digital scan converters

Author(s): Berry, T.R.; Snowball, T.

Author Affiliation: Royal Radar Establ., Malvern, UK

Conference Title: AGARD Conference Proceedings No.167 on Electronic Airborne Displays p.22/1-25

Publisher: AGARD, Neuilly sur Seine, France

Publication Date: 1975 Country of Publication: France vi+432 pp.

Conference Sponsor: AGARD

Conference Date: 7-11 April 1975 Conference Location: Edinburgh, UK

Language: English Document Type: Conference Paper (PA)

Treatment: New Developments (N)

Abstract: Looks at ways in which digital scan converters can improve on conventional radar display formats. It is shown how the introduction of the fast semi-conductor Random Access Memory (RAM) has made the axis-transformation problem a relatively straightforward hardware implementation of conventional axis-conversion formulae. Special display and conversion problems associated with moving platform systems are outlined, and techniques for applying motional stabilisation to the converter to facilitate scan to scan integration discussed. The organisation of such 'ground stabilised' converters to provide a choice of ground or platform stabilised displays are then described. Finally, the limitations of a simple system based on a single picture point update per store word access (Spot at a Time Transfer) is considered, and a more complex organisation which allows for more than one spot to be updated at a time is outlined. (1 Refs)

Subfile: B C

Title: Polar to cartesian axis-transforming digital scan converters

2/7,K/35 (Item 26 from file: 2)

.DIALOG(R)File 2:INSPEC

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00871807 INSPEC Abstract Number: B76008453, C76006475

Title: Converting digital polar co-ordinates to x,y form

Journal: Electronic Engineering vol.48, no.575 p.14-15

Publication Date: Jan. 1976 Country of Publication: UK

CODEN: ELCEA9 ISSN: 0013-4902

Language: English Document Type: Journal Paper (JP)

Treatment: Practical (P)

Abstract: For internal efficiency and convenience, some computer programs require two-dimensional position data to be given in polar co-ordinates, i.e.: $Z=r \text{ angle } \theta = r(\cos \theta + j \sin \theta)$. If r , $\sin \theta$ and $\cos \theta$ are in digital form, a relatively simple combination of multiplying d-to-a converters can be used to obtain directly the proper x and y analogue voltages for feeding displays. The system is shown using the DAC-08, a Precision Monolithics eight-bit multiplying dac. (0 Refs)

Subfile: B C

Identifiers: **converting polar coordinates to Cartesian ;**

2/7,K/40 (Item 3 from file: 6)

DIALOG(R)File 6:NTIS

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0484997 NTIS Accession Number: AD-D000 223/8/XAB

True Wind Speed Computer

(Patent)

Kurk, T. R.

Department of the Navy Washington D C

Corp. Source Codes: 110050

Report No.: PAT-APPL-341 000; PATENT-3 800 128

Filed 14 Mar 72 patented 26 Mar 74 6p

Document Type: Patent

Journal Announcement: GRAI7508

Supersedes PAT-APPL-341 000.

Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 \$0.50.

NTIS Prices: Not available NTIS

The patent describes an analog computer for calculating and displaying in digital form the speed and direction of true wind for a ship. Ship's speed and course and wind speed and direction are provided as inputs to a computer which calculates true wind speed by vectorially subtracting ship's velocity from wind speed. The subtraction is accomplished by electronic differential amplifiers which provide true wind speed in cartesian coordinate form. These **Cartesian** coordinates are **converted** into **polar** coordinates which are then fed into an analog to digital converter so that a readout can be displayed in digital form.

... accomplished by electronic differential amplifiers which provide true wind speed in cartesian coordinate form. These **Cartesian** coordinates are **converted** into **polar** coordinates which are then fed into an analog to digital converter so that a readout...

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.?t s2/7,k/41,48

2/7,K/41 (Item 4 from file: 6)
DIALOG(R)File 6:NTIS
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0453613 NTIS Accession Number: COM-74-11253/3/XAB

Computer Software for Rainfall Analyses and Echo Tracking of Digitized Radar Data

(Technical memo)
Ostlund, S. S.
National Oceanic and Atmospheric Administration, Boulder, Colo. Weather Modification Program Office.

Report No.: NOAA-TM-ERL-WMPO-15; NOAA-74052009

Mar 74 88p

Journal Announcement: GRAI7419

Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.

NTIS Prices: PC A05/MF A01

The paper describes computer software designed for digitized radar data. Program packages include a scan- **conversion** from a **polar** to a **Cartesian** grid system, a rain summation analysis over selected areas within the whole area, and an echo tracking program which calculates total rainrates and rainfalls from isolated echoes matched from frame to frame. All the results may be drawn on a pen plotter for easier interpretation. (Modified author abstract)

The paper describes computer software designed for digitized radar data. Program packages include a scan- **conversion** from a **polar** to a **Cartesian** grid system, a rain summation analysis over selected areas within the whole area, and an...

2/7,K/48 (Item 3 from file: 148)
DIALOG(R)File 148:Gale Group Trade & Industry DB
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05549648 SUPPLIER NUMBER: 11704339 (THIS IS THE FULL TEXT)

Vision system cuts armor plate overspray.

Ettinger, Gary; Christian, Donald J.
Industrial Finishing, v67, n12, p15(3)
Dec, 1991

TEXT:

Vision System Cuts Armor Plate Overspray

Spray guns turn on and off according to pattern seen. Paint savings of 25% translate into additional benefits

A unique vision system is bringing a 25% paint savings in the coating of armor plate for U.S. military vehicles. The savings translates into the additional benefits of reduced waste disposal, decreased booth cleaning and equipment maintenance and lowered volatile organic compound emissions.

The painting is being done at FMC's Ground Systems Div. plant (Santa Clara, CA). The system deposits milspec epoxy primer and polyurethane topcoat.

The steel armor plates range in length and width from 10 by 24 in. to 72 by 72 in. and in thickness from 0.201 to 1.375 in. They range widely in configuration from rectangular to circular. Some have cutouts of up to 48 in. across. Most have numerous mounting holes of 1 in. in diam or less.

The paint line includes an overhead conveyor, paint booth, primer oven and topcoat oven. Paint application is by automatic electrostatic guns mounted on vertical reciprocators.

Plates entering the paint shop have various surface conditions. Some have been stored outdoors and are rusty; others are new and shiny. Shot blasting prepares the surfaces for painting.

Each plate is hung onto the conveyor by inserting two metal rod

hangers into mounting holes. Because lot sizes are usually small in number (even lots of one unit are common), plates are hung in random fashion.

The conveyor makes two passes through the spray booth. Each pass is followed by a bake oven cure cycle. In the first pass the plates are conveyed between opposing reciprocators for the epoxy primer application. In the second pass they are moved between a different set of opposing reciprocators for the polyurethane application.

The vertical up-down motion of the reciprocators carries the spray guns well above and below the upper and lower edges of the plates. The vision system controls paint flow so that each gun cycles off and on automatically at a fixed distance from these upper and lower edges. The vision system and programming also stop paint flow as the guns pass through cutout areas. Paint savings are realized by spraying only when a surface to be coated is in front of a gun.

The vision system automatically "ignores" cutout holes smaller than 1 in. It also minimizes paint application on hangers by "erasing" the hangers from vision detection.

Programming the vision system to see a slightly enlarged plate facilitates efficient painting of plate edges. This allows the guns to spray "just beyond" surface edges, ensuring good edge coverage. A "zero overspray pattern" would produce poor edge coverage.

Image information/acquisition

Plates are scanned by lasers before entering the paint booth for priming and scanned again before entering the booth for topcoating. The scanners discern the shape of a plate by firing a laser directly into a reflective strip mounted across the conveyor line. A plate obstructs the view of the reflector, forming the image.

In each scanner a fixed laser beam fires through a beam splitter into a spinning mirror. This rotates the beam through a 360-degree arc, of which only about 113 degrees is emitted from the unit. The reflector returns the beam coincidentally through the rotating mirror, where it passes again through the beam splitter and into a photodetector. A microprocessor digitizes the signal into linear pixels (signals) to form a scan line. Rasters (horizontal scan lines) are assembled to form a continuous image of the conveyed stream.

When a portion of the beam is interrupted, the processor sees an object as a dark silhouette against a bright reflection. Surface features on the object have relatively low amplitude and are ignored by the scanner.

Each laser scanner has a glass viewing window to protect the sensor. The reflectors are also shielded with a glass strip. This permits easy cleaning of the assembly without risk of damage to the precision optics.

The helium-neon lasers emit a narrow band of visible frequencies. The received light is filtered before entering the photodetector to eliminate other light. The detected signal is then amplified and clipped to produce a binarized (bilevel) signal indicating "0" (no object present) or "1" (an object present).

On each scanned line 15,360 optical pixels (0s or 1s) are stored. Each pixel requires only 0.006 degree of sweep. Since 20 scans are made per sec, more than 300,000 pixels are imaged per sec. The lines of pixels are loaded into memory serially as a plate passes the sensor and are shifted along to match the moving conveyor. They are removed from memory after a plate passes the last sprayer.

Each run of pixels or a scan line is called a linear blob. After the raster lines are assembled, a two-dimensional blob pattern is apparent that corresponds to the geometry of the plate.

The scanner forms its image in polar coordinate space that is established by an encoder keyed to the scanner rotating mirror. The **polar** coordinates are **converted** to **cartesian** coordinates in order to control the sprayers.

The scanner laser output is less than 0.25 mW. Since the scanner's beam is moving continuously, only 3% of its energy reaches the target, making the system very safe. It could only cause potential eye damage by the deliberate staring into the beam for a long period.

It would have been possible to instruct the control system with a knowledge of each plate shape and specific painting instructions. Such a system was rejected because of the need for continual maintenance of the knowledge base. New plates would require the creation of records in memory

.before they could be painted.

The system is completely sensor-based. All necessary instructions are derived from the incoming stream of sensor data. Once a plate has passed through the system, all knowledge about its shape is gone. Only certain statistics are retained.

As each raster line is formed, the laser scanner transmits the encoded pixel stream to the host programmable logic controller (PLC). The PLC assembles the rasters into a two-dimensional image. Each 1 in the image represents a section of the plate. Each 0 represents empty space. A cutout in the middle of a plate will be visible in a binary map, as will the plate's hangers and mounting holes.

Mounting holes are filtered out by the laser scanner processor. It is set to ignore holes less than 1 in. in diam by removing all white blobs shorter than a few pixels. This does not disturb the highly precise edge locations of the plate. The hole data are eliminated from the run-length code and therefore never communicated to the host PLC.

A nonlinear filter is applied across the top edge of a plate to eliminate the hangers. The filter monitors peaks within a 5-in. structuring element on the top edge and triggers the filter when a value exceeds a threshold.

The raw plate map of pixels is modified slightly to add the overspray zone around perimeter and cutout boundaries. This is accomplished by changing perimeter and cutout border 0s to 1s. This swells the image slightly.

The plate map is used to synthesize the control commands fed to spray guns. A spray gun's predicted up-and-down "triangular wave" travel path is plotted against the plate map, and the intersections with plate edges are computed. These intersections are converted to time coordinates, representing the estimated time of arrival of the spray carriage at a plate's edges. Commands to turn the spray on or off are generated and applied to the guns.

The PLC control program is written in "ladder logic." The program contains more than 1000 rungs, each corresponding roughly to one line of code in a procedural language.

In a normal PLC scan cycle all rungs to be executed would take about 100 msec, yielding a scan rate of 10 Hz. This would not be sufficient to maintain adequate control over the reciprocating sprayers. To reduce the scan time, the software is segmented into 52 subroutines that are conditionally executed. The main program is executed every scan, generating two to six subroutine calls per scan. The various subroutines are specialized to perform operations such as:

- * monitoring the operator console
- * communicating with laser scanner
- * receiving/assembling plate map
- * dilating the map for overspray
- * filtering out hangers
- * shifting the plate map in sync with the conveyor motion
- * updating the spray gun commands based on gun and conveyor position.

This tree of conditional execution reduces the typical scan time to 6 msec and a scan rate of 167 Hz. The most time-sensitive device is the spray gun timer controlling the time that the gun is turned off and on. These times correspond to the position of the gun as it reciprocates. Gun timer commands are updated on every PLC scan.

Some of the major hardware components include: Allen-Bradley PLC 5/25, 1771 digital I/O modules, Allen-Bradley Basic module with serial port, Namco Lasernet LN110-30001 laser scanner and Namco converter.

PHOTO : Floor plan of the spray booth area

PHOTO : Laser imaging station (side view)

PHOTO : Drawing (left) shows theoretical reciprocating spray pattern across a moving conveyed object. Drawing (right) shows same spray pattern with spray gun turned off when no target is present.

PHOTO : As each raster line of a part is scanned, the laser scanner transmits the encoded pixel stream to the host PLC. The rasters are assembled into a two-dimensional image (right). Each "one" in the image represents a section of the part; each "zero" is empty space. Note that the cutout in the middle of the part is visible in the binary map. The suspension hooks show up as lines at the top of the map; two small mounting holes appear as zeroes near the bottom corners.

PHOTO : Raw part map (top), and part map after "morphological dilation" (bottom). Expanding the spray pattern slightly ensures good part

edge coverage.

Gary Ettinger and Donald J. Christian FMC Corporate Technology Center
Santa Clara, CA

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... coordinate space that is established by an encoder keyed to the scanner rotating mirror. The **polar** coordinates are **converted** to **cartesian** coordinates in order to control the sprayers.

The scanner laser output is less than 0...

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2/7,K/51 (Item 1 from file: 34)

DIALOG(R)File 34:SciSearch(R) Cited Ref Sci
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11152204 Genuine Article#: 615HT Number of References: 21

Title: A data conversion technique for accurate interferometric testing of spherical surfaces

Author(s): Qiang XF; Gao W (REPRINT) ; Kiyono S

Corporate Source: Tohoku Univ,Fac Engn, Dept Mechatron & Precis

Engn,Aramaki Aza Aoba 01/Sendai/Miyagi 9808579/Japan/ (REPRINT); Tohoku Univ,Fac Engn, Dept Mechatron & Precis Engn,Sendai/Miyagi 9808579/Japan/

Journal: JSME INTERNATIONAL JOURNAL SERIES C-MECHANICAL SYSTEMS MACHINE ELEMENTS AND MANUFACTURING, 2002, V45, N3 (SEP), P697-702

ISSN: 1344-7653 Publication date: 20020900

Publisher: JAPAN SOC MECHANICAL ENGINEERS, SHINANOMACHI-RENGAKAN BLDG, SHINANOMACHI 35, SHINJUKU-KU, TOKYO, 160-0016, JAPAN

Language: English Document Type: ARTICLE

Abstract: This paper presents a **Cartesian to polar conversion** technique based on a polynomial interpolation. The method is used for the processing of data from the two-orientation method for measuring spherical surfaces with an interferometer. The interferometer output consists of points on a square-grid coordinate system, which are then converted to a polar-grid coordinate system. The profile height data of the points on the polar-grid are calculated from a polynomial neighborhood analysis of points on the square-grid. Since the converted point on the polar-grid does not need to be at the center of the points in the analysis, profiles along concentric circles near to the edge of the test surface can also be calculated. A simulation of the polynomial and conventional 4-point techniques is carried out to verify the process. The comparison shows that the polynomial technique has produce a higher data conversion accuracy. Experiments on a phase-measuring interferometer were also conducted to verify the approach.

Abstract: This paper presents a **Cartesian to polar conversion** technique based on a polynomial interpolation. The method is used for the processing of data...

2/7,K/53 (Item 3 from file: 34)

DIALOG(R)File 34:SciSearch(R) Cited Ref Sci
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06133823 Genuine Article#: XX257 Number of References: 4

Title: Rapid and precise method to convert a two dimensional image from Cartesian to polar coordinate system

Author(s): Wu WM (REPRINT) ; Kato Y; Yamazaki K; Yoshino M; Danjo A; Kobayashi N

Corporate Source: RICE UNIV,RICE QUANTUM INST, POB 1892/HOUSTON//TX/77251 (REPRINT); TOKYO METROPOLITAN UNIV,DEPT PHYS/TOKYO 19203//JAPAN//; OLYMPUS OPT CO LTD,/HACHIOJI/TOKYO 192/JAPAN//; SHIBAURA INST TECHNOL,/OMIYA/SAITAMA 330/JAPAN//; NIIGATA UNIV,DEPT PHYS/NIIGATA 95021//JAPAN/

Journal: REVIEW OF SCIENTIFIC INSTRUMENTS, 1997, V68, N9 (SEP), P3490-3493

ISSN: 0034-6748 Publication date: 19970900

Publisher: AMER INST PHYSICS, CIRCULATION FULFILLMENT DIV, 500 SUNNYSIDE BLVD, WOODBURY, NY 11797-2999

Language: English Document Type: ARTICLE

Abstract: A method is described to convert a two-dimensional image, which is the pattern of the scattered electrons from on target gas measured by a torodial type analyzer with a detector consists of a pair of multichannel plates and a position sensitive detector from detector's recording system, a Cartesian coordinate system, to a polar coordinate system in which physical quantities (the energy and angle of a scattered electron) are expressed. By this method, the converting

coefficients are calculated with high precision and the kernel (nonzero) coefficients are stored for data conversion on disk. Since there is symmetry in the coefficients, only part of the coefficients need to be calculated and stored. A simple method for compressing: the storage space of the coefficients also is described. (C) 1997 American Institute of Physics.

Title: Rapid and precise method to convert a two dimensional image from Cartesian to polar coordinate system

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